

Shiawassee National Wildlife Refuge

Lake St. Clair Closed Area

Wyandotte National Wildlife Refuge

Michigan Islands National Wildlife Refuge

United States Department of the Interior

Fish and Wildlife Service

Bureau of Sport Fisheries and Wildlife

Saginaw, Michigan

Shiawassee National Wildlife Refuge

Annual Narrative Report

1968

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United States Department of the Interior

Fish and Wildlife Service

Bureau of Sport Fisheries and Wildlife
Shiawassee National Wildlife Refuge
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Saginaw, Michigan 48601

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I. GENERAL

A. Weather Conditions - 1968

	Month	<u>Precipitation</u>		<u>Max.</u> <u>Temp.</u>	<u>Min.</u> <u>Temp.</u>
		<u>Normal</u>	<u>Snowfall</u>		
January	1.82	1.11	17.46	46	-12
February	1.17	1.76	7.60	47	-12
March	1.37	1.28	12.00	74	10
April	0.95	3.35	1.0	80	24
May	4.14	3.08	-	85	27
June	5.89	3.89	-	93	43
July	0.71	3.56	-	95	42
August	3.02	2.74	-	90	44
September	3.72	2.39	-	87	39
October	1.44	3.54	-	84	27
November	2.96	3.93	0.2	74	21
December	2.59	1.75	12.6	50	3
Annual Totals	<u>29.78</u>	<u>32.38</u>	<u>50.86</u>	Extremes <u>95</u>	<u>-12</u>

1968 started out with heavy snows and near zero temperatures and this condition prevailed until the last week of January. Typical Michigan winter weather followed. On January 28 the rains came. Steady rainfall and above normal temperatures continued through February 3 and the end result was a major flood in the Valley with up to 6,000 acres inundated until February 15. As colder, more normal temperatures followed, and rivers were again back within their banks, most of the previously flooded land was locked under a vast sheet of ice up to 14" thick. Another 12 inch snowfall was recorded on March 23 but it was the last taste of winter as warmer temperatures followed and spring arrived on schedule.

Precipitation was below normal for the year although several rainy periods halted farming operations at different times during spring and fall months. The year can best be characterized as the typical, atypical, Michigan year. Abnormal weather conditions of note included the unusual February flood, a dry spring and summer with many days with high winds, a record heat wave in July and August, the extended "Indian Summer" lasting through mid-November, and steady rains from November 15 through December 1.

The first snow of record was received on December 1 following a two week rainy spell and this was followed by rapid and immediate freeze-up on December 6. On December 27 and 28 a severe sleet storm struck the Saginaw Valley with ice coatings up to one inch thick on everything causing extensive tree damage and a massive power failure in the area as ice-coated transmission lines broke under the weight of the ice. Snow followed the sleet and there are three inches of snow on top of one inch of ice at the end of the year.

B. Habitat Conditions.

1. Water. All rivers were at high levels at time of freeze-up, with the Cass River running bank-full. Following the first heavy snowfall on January 15, warmer temperatures and heavy rains during the last week of the month caused some flooding along the Cass River and the Spaulding Drain. On February 2 flood waters entered Pool 1b across the south spillway, washed out the low level dike separating Pools 1a and 1b, and then overtopped Pool 1a dikes and caused another wash-out at the "Old Womans Hole". On the following day the north and east dikes of Pool 2 were overtopped flooding Pool 2. East of the refuge, the Birch Run Drain broke through, also on February 3, flooding large areas east of the Spaulding Drain. At this time State Highway M-13 was closed to traffic because of high water just north of the Cass River and south of the Flint River.

The flood peak was reached on February 4 at elevation 588.00. Two major washouts occurred in the south dike of Pool 2 at this time, flooding all of crop units 2, 3 & 4. Levels began falling off on the 5th and rivers were back within their banks by February 15, but trapped flood waters froze forming a vast ice sheet on an estimated 6,000 acres of refuge and private lands.

A second flooding through dike washouts occurred with a second rise in the rivers on March 25. The Spaulding Drain dike washed-out on this date flooding Farm Unit 9.

Temporary dike repairs to Pools 1a and 2 dikes were completed by April 2 and all pools were at or near approved elevations the rest of April and most of May. During the last week of May a three inch rain again caused a rise in the rivers and another flooding as the repair work on dikes of Pools 1a and 2 was again washed out on May 30.

As rivers returned to normal summer levels, Pools 1b and 2 were held near approved elevation but Pool 1a was drained through the major break in the dike along the Ferguson Bayou, until another rise in the rivers caused lesser local flooding on June 20. Pool 1a was refilled at this time, but as breaks in the dike could not be repaired, it was again nearly dry by June 30.

Pools 1a and 2 dikes were finally patched July 5 and pumping was started to bring levels in Pool 1 to approved elevation. Pumping continued in Pools 1 and 2 through August and into September until the ancient and obsolete Pool 1 pump broke down and left us without a water supply for Pool 1.

During the rest of the year, until freeze-up, pool levels gradually dropped until at time of freeze-up Pool 1a was about one foot below approved elevation, but Pools 1b and 2 were maintained near approved elevations.

farmers this year, when they became quite concerned about geese eating their winter wheat. This will undoubtedly become an increasing problem in future years.

The refuge share of the 1968 corn crop was again left standing and will be knocked down to provide food for the spring migrants.

II. WILDLIFE

A. Migratory Birds.

1. Whistling Swans. The first migrants were observed March 17 when 37 swans were seen in a flooded corn field of Farm Unit 1A. 500 were present on March 19 and numbers increased until the peak of 2,000 was recorded on April 4.

Major areas of use by the swans was again in Crop Unit 1, although for the first time, flooded corn in Farm Unit 9, located east of the Spaulding Drain, was heavily utilized also. The swans were observed feeding mainly on corn and using roads and grass strips for loafing.

As flood conditions subsided and croplands were de-watered, swans started moving on in early April. There were eight swans still present on April 12 and the last observation of a single swan was recorded in mid-June.

The fall migration of swans was normal, with few birds observed. Four swans were seen in Pool 1A on October 31, but three of these were shot by hunters on the adjoining State Game Area three days later. The peak fall population reached 51 swans on November 16, and the last observation of a single swan was on November 23.

2. Geese. There were 4,500 Canada geese on the area at the beginning of 1968 but these all pulled out ahead of the major snowstorm of January 15, and no geese were observed using the refuge after that date. During the winter we received several reports from local observers of small flocks of geese, and it is suspected that a few geese do winter on the Tittabawassee River, which is highly polluted by Dow Chemical Company and does not generally freeze.

The first 29 spring migrant Canada geese were observed on March 5. The migration progressed rapidly with 7,500 censused on March 17, 11,300 on March 18, and the peak population of 15,000 recorded on March 25. The main flock of migrants had moved on by the middle of April and by the last week of April only the 700+ geese representing our nesting flock remained on the area.

The first observation of blue and snow geese was on March 21 and the peak of 10 blues and 6 snows was recorded on April 17. Blues and snows were last seen on April 30. No observations of White-fronted geese were reported.

River marshes were flooded throughout the summer months furnishing several hundred acres of additional waterfowl habitat.

As has become to be accepted as normal, refuge water conditions in 1968 were characterized by either too much or too little. Again this year fall precipitation left the ground saturated and most ditches bank full at freeze-up, with full potential for major flooding again in the spring of 1969.

2. Food and Cover.

Food and cover conditions were excellent for all wildlife species during the year. Spring migrants fed exclusively in flooded crop-lands, especially corn fields where the refuge share of the 1967 crop had been knocked down early in the winter. Flooding of refuge lands east of the Spaulding Drain for the first time provided a major attraction to geese and swans so that spring concentrations of waterfowl were spread over a much larger part of the refuge acreage this year. Major flooding of pools at the time the marshes were opening up again limited availability of natural foods on the refuge and this was reflected in limited use of pool areas by spring migrants.

Generally low water levels in pools during the summer months provided the stimulus for an abundant growth of emergents to provide excellent cover condition and an abundance of natural foods. An excellent crop of smartweed and wild millet was again produced in Pool 1, and as water levels were raised in late summer these natural foods were heavily utilized by dabbling ducks.

The goose flock, with the years production of goslings, utilized farm crops in Crop Unit 1 most of the summer. Approximately 460 acres of barley, 67 acres of wheat, 75 acres of millet, and 70 acres of soybeans, received as the refuge share from the farming program were mowed down with rotary mower for waterfowl use. These grains were completely utilized by waterfowl, doves, and deer during August and September. Feeding flights out to private lands by both ducks and geese were commonly observed late in the season.

Canada geese fed extensively and almost exclusively on sugar beets during late October and November. As an experiment, 8 acres of sugar beets were taken as refuge share and beets were lifted and then spilled out on top of the ground. 196 tons of whole beets were completely eaten by geese. 147 tons on Farm Unit 1A were completely eaten in ten days as an estimated 12,000 geese fed on the whole beets spilled on top of the ground.

During late November and most of December, geese utilized winter wheat and other green browse on the refuge and on surrounding private lands. The first complaints were received from local

First nesting activity by the Canada geese was observed on March 11 on islands in Pool 1B, and by March 23, peak nesting activity was evident. The annual nesting survey was conducted during the last week of April and 55 active nests, with a total of 304 eggs, were located at this time. The first goose brood was observed on May 6 and major hatching period was completed by May 16. Gosling production in 1968 totalled 267 as compared to 180 hatched in 1967.

Goslings were drive-trapped in Farm Units 1A, 1B and 1C during early June and a total of 178 were banded at that time. Goslings were marked with orange on white leg bands to identify them as 1968 birds.

The first fall migrants were observed the second week of September bringing the refuge goose population to 3,600. Numbers increased gradually until the fall peak of 19,600 Canada geese and 450 Snow-Blue geese was recorded on November 15. A few small movements occurred after that but there were 16,500 present on December 6. Most of these pulled out the following week and there are 2,000 geese remaining at the end of the year.

New highs were established in 1968 with the peak concentration of 19,600 and the total goose use days of 1,680,700.

Migrant geese utilized available wheat and barley early in the period, moved to winter wheat and other green browse as it germinated, and then fed exclusively on sugar beets as soon as the harvest started in the middle of October. After the beets were cleaned up geese moved back to green browse and corn.

Observations of neck-banded Canada geese during the year were as follows:

March 14	Solid White	(Yazoo NWR)
October 21	Orange/Green	(Wapanocca NWR)
November 15	Solid White	(Yazoo NWR)

3. Ducks. There were 800 ducks, Mallards and Black ducks, on the area at the beginning of the year, but these moved out ahead of the first big storm on January 15, except for a few that wintered on the refuge. The first spring migrants appeared on March 10 with the arrival Pintails and Baldpates. Ring-necked ducks and Mallards were present on March 11, followed by Goldeneyes, Buffleheads, Lesser Scaup, Wood ducks, Green-winged teal, Blue-winged teal and Canvasbacks on March 17, and Shovellers on March 22. All common species were present on the area by the end of March.

With general flooding in the area during most of the spring, ducks did not concentrate on the refuge, but were observed in flooded fields throughout the valley. The spring peak of only 7,000 ducks

was reached the last week of March and was about equal to the 1967 spring peak population. The major migration movement occurred the last week of April and by May 10 the summer population had stabilized at an estimated 600 ducks.

The first brood of 1968 was recorded on June 14 when a brood of Wood ducks was observed in Pool 2. Only random brood observations were made during the summer and the refuge production is estimated to be 195 ducks, a marked decrease from production of recent years.

Numbers of ducks using the area began to increase late in July and by September 1 the population had reached 16,300. Numbers continued a dramatic increase weekly until the peak of 70,200 was recorded on October 27. This peak was approximately equal to the 1967 fall peak, but was reached about one week earlier than in 1967. As the season progressed, the ducks moved on but an estimated 1,100 Mallards and Black ducks are still present on the refuge at the end of the year.

Duck use days for 1968 totalled 4,719,374, as compared to 4,042,094 duck use days recorded in 1967. This greater use day total reflects the earlier peak date and peak numbers present over a longer period than in previous years. The shorter duck hunting season probably also was a factor in the increase in fall use days.

Major feeding activities of ducks during the summer were confined to the pool areas with the abundance of natural foods available there. As harvest operations progressed feeding flights to stubble fields commenced and then heavy utilization of refuge fields occurred as the wheat, barley and millet was knocked down. Later in the fall ducks concentrated on soybeans and corn.

Major flights between the refuge and the adjoining Shiawassee River State Game Area occurred daily during the fall. Flooded corn fields on the game area were the strong attraction to Mallards and Black ducks at this time.

4. Coots and Gallinules. Coots were first observed on March 11 in the Shiawassee River marshes. The spring peak of 200, which was also the summer population was reached the last week of April. Production of Coots was near normal this year and broods were commonly observed in Pool 2 most of the summer. No noticeable fall build-up occurred on the refuge and the last observation was recorded on November 8.

Common gallinules were first seen on May 22. Few observations were recorded during the summer but a few broods were produced. The last observation of a gallinule was on October 16.

5. Other Water Birds. First arrival observations of various species were recorded over an extended period commencing with observations of two Great Blue Herons on March 20 followed by Common Egret on March 27, Pied-billed Grebes on March 31, Green Heron on April 18, and American Bitterns in late June. Populations of various species were estimated to be about normal during the year and all species except Great Blue Herons had migrated by early October. 16 Great Blue Herons were still present on December 8. Only one observation was recorded of Sandhill Cranes when 18 were reported by Hoff on November 10.
6. Shorebirds, Gulls and Terns. Recorded spring arrival dates include Killdeer on March 18, Dowitchers on April 30, Yellowlegs and unidentified Sandpipers on April 12, Spotted Sandpiper and Common Tern on April 30. Ring-billed Gulls and Herring Gulls were present all through the year. Late summer migration of shorebirds passed through the area in late July and early August, and all species, except the gulls, had departed by the middle of October.

B. Upland Game Birds.

Ring-necked Pheasants continue to decline in Michigan. The few periodic observations during the year indicated that few pheasants are on the refuge area. No pheasant broods were observed during 1968, and the total population is estimated at 50 birds.

Mourning Doves are commonly observed every month of the year with a small flock wintering at the corn crib at Secondary Headquarters. Production appeared normal during the summer and a peak of 300 doves was estimated during September.

C. Big Game Animals.

White-tailed deer are commonly observed every month of the year. During the winter months the deer concentrate in Crop Unit 1 and herds of 50 to 100 deer are frequently counted. During the February flood the deer were concentrated in the woods area east of the Secondary Headquarters. The number in this small woods of about 15 acres was estimated at 500 head. On February 26, an actual count of 478 deer was made in corn fields in Crop Unit 1 and these large herds were commonly observed through most of March after which the deer moved out of the open fields and into the woods. The first fawn was seen on May 14 and numerous daily observations after that indicated another bumper crop with many sightings of twins and triplets.

The herd was estimated at 1,000 deer at the time the hunting season opened in November. Our observations and estimates indicate that about 300 deer were removed by hunters with an estimated 100 bucks taken during the 16 day bucks only gun season with an illegal kill of about 50, and another 150 deer taken during the special late bow and arrow season which extended from December 1 to 31.

On November 23, about mid-way through the gun season, a count of deer in the open fields within the closed area tallied 466 deer of which only five had antlers. Bow and arrow hunters scattered the deer concentrations effectively and at the end of the year, deer are observed only infrequently in the open fields on the refuge.

D. Fur Animals, Predators, Rodents and Other Mammals.

The muskrat population is at a very high level in the refuge area and dike damage from burrowing is a serious problem, especially in Pool 2. The current population is estimated, from house counts, at 3,000 muskrats and permittee trapping operations are in progress to reduce the population. The heavy muskrat infestation in Pool 2 is effectively opening up the dense stands of cattail to make the area more attractive to waterfowl.

At least seven active beaver lodges are located in or near Pool 1 and two are located near Pool 2. One family set up residence in the County Drain north of the Secondary Headquarters and had to be removed as they insisted on cutting down all the windbreak trees and damming the drain. Beaver are protected in this part of the state and so are increasing annually. Their activity generally is beneficial as they have been doing an excellent job removing trees from the Pool 1 dikes.

Mink and weasel populations remain at a low level and appear to be present in normal numbers.

Raccoons are numerous and increasing, but predation on waterfowl is apparently minimal.

Skunks are only infrequently observed and appear to be present in normal numbers.

Red foxes are at a high population level and are commonly observed rodent hunting in the croplands. The fox continues to serve as an efficient scavenger and presents no specific problems yet.

E. Hawks, Eagles, Owls, and Crows.

Marsh hawks, red-tailed hawks, sparrow hawks, Cooper's hawks and turkey vultures are commonly observed summer residents. American Rough-legged hawks are winter residents and have been present since early November. All hawk species appeared to be present in normal numbers during the year.

The first Bald Eagle observation was on March 31 when a lone immature bird was seen in Crop Unit 1. Two adult eagles were seen feeding on a muskrat carcass in Pool 1B on April 9 and two adults and one immature were observed occasionally all summer. The last observation was of a single adult and one immature bald eagle on October 28.

Great horned owls, short-eared owls, long-eared owls and screech owls are resident birds and were observed infrequently during the year. Only one observation of a Snowy owl was recorded during 1968 and this was of a single bird on December 18.

Crows were commonly observed from early March through early December. The peak, estimated at 300, was present on the area most of September.

F. Other Birds.

No unusual observation during the year.

G. Fish.

Refuge rivers and pools are infested with carp and control measures are useless so long as the refuge is subject to annual flooding.

H. Reptiles and Amphibians.

No unusual observations during the year.

I. Disease.

No outbreaks were observed except the usual number of swans that weaken and die during the spring migration. Two swans were delivered to the University of Michigan and cause of death was attributed to lead poisoning. This is an annual occurrence at Shiawassee during the spring migration and it has been assumed that the birds pick up the lead on the wintering area and only make it this far before they weaken and die.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development.

1. Dikes and Ditches.

Contract work was completed for Pool 3 dike construction and installation of a control tube during November.

Flood damage emergency repairs were completed to washed-out section of dikes of Pool 1, Pool 2, and the east side of the Spaulding drain.

Drainage ditches were cleaned and brought to grade, and new pumps installed at Farm Units 9E and 11A.

Drainage ditches were cleaned and brought to grade on Farm Units 9B and 9C.

All dike tops were mowed as required during the summer.

2. Roads and Trails.

All refuge roads were graded periodically and additional gravel hauled and placed on field road in Farm Unit 6.

Gates were constructed and installed to close access roads on the north side of the refuge.

3. Fencing and Posting.

The entire refuge boundary was checked and reposted where required prior to the waterfowl season. Public hunting areas were posted prior to opening of the deer hunting season.

Boundary fences were re-constructed where flood and ice damage occurred along the east side of the refuge. Boundary fencing was completed along the north side of the refuge and right-of-way dozed out at north east corner.

Lake St. Clair and Wyandotte Refuges were posted in September and bouys removed after close of waterfowl season in early December.

4. Miscellaneous Jobs.

Routine maintenance of the nature trail during the summer involved mowing and replacement of directional signs.

Pool 1B permanent cannon-net trapping site was re-shaped and gravelled.

Old buildings were burned and debris and junk buried at two old home sites.

The managed goose hunt was conducted again and preliminary work included repair of blinds, construction of new blinds, and placing of the blinds in the public hunting areas. All blinds were removed for winter storage at close of the goose hunting season.

The Northwest crane, D-7 tractor, and Austin-Western grader were steam cleaned and re-painted.

All regular and routine repairs and maintenance of vehicles, heavy equipment, pumps and buildings were completed as scheduled.

B. Plantings.

1. Aquatic and Marsh Plants.

None.

2. Trees and Shrubs.

None.

3. Upland Herbaceous Plants.

Approximately five acres was seeded to permanent grass strips in Farm Unit 1A and along the boundary fence line on Farm Unit 11A.

4. Cultivated Crops.

Farm crops were planted on 3,061 acres of refuge croplands but all crops were lost to flooding on 63 acres, so net crop acreage for 1968 was 2,998 acres. All farming operations were conducted under cooperative farming agreements with local farmers. Refuge crops and yields data are summarized on NR-8 and in the following tabulations. The nine crops produced on refuge lands in 1968 were wheat, barley, oats, corn, soybeans, white beans, millet, and sugar beets.

The first field work on the refuge was on April 12 and most work ran about two weeks earlier than normal. Barley was up by April 24 and corn planting started on April 29. It was a variable year weatherwise with early spring start for field work but heavy rains in June, hail in July, and too warm in August for some crops. However, the first killing frost was late and most crops matured. Yields were somewhat below normal and prices received by farmers were the lowest in years.

The refuge share of crops left in the field for wildlife was 67 acres of wheat, 464 acres of barley, 67 acres of soybeans, 40 acres of buckwheat, 7 acres of oats, 75 acres of millet and 8 acres of sugar beets. All wheat, barley, oats, and millet was chopped with the rotary mower in July and early August and most had been completely utilized by waterfowl and deer by early September. 176 acres of corn was left standing and was later knocked down in late December to make it available to spring migrants, 30 acres of corn was harvested, yielding 1,608 bushels of dry shelled corn, and put in storage for refuge use, and for transfer to Seney and Ottawa Refuges.

Cover crops were seeded on 1,730 acres for erosion control, soil building and/or green browse. This acreage included ryegrass in corn, clover in small grains, winter wheat, and green browse on white bean fields after harvest.

The annual meeting with all cooperators was held at the refuge office in February to discuss farm program changes, crop yields and mutual problems. This annual meeting has become one of the highlights of the cooperative farming program and is enjoyed by all individuals attending.

SHILAWASSEE NATIONAL WILDLIFE REFUGE

REFUGE CROPS - 1968

<u>CROP</u>	<u>TOTAL ACREAGE</u>	<u>% OF TOTAL</u>	<u>AVE. YIELD</u>	<u>AVE. VALUE</u>
WHEAT	225	7.5	46	\$ 48.02
BARLEY	574	19.2	56	\$ 56.33
CORN	601	20.0	70	\$ 58.42
WHITE BEANS	932	31.0	17	\$ 69.82
SOYBEANS	898	13.3	31	\$ 71.42
BUCKWHEAT	20	1.3	est. 50	Not Harvested
MILLET	75	2.5	est. 50	Not Harvested
OATS	16	0.5	56	\$ 27.78
SUGAR BEETS	137	4.7	23.8 tons	\$210.97
<u>TOTALS:</u>	<u>2,998</u>	<u>100.0</u>	<u>--</u>	<u>\$ 77.54</u>

CROP YIELDS - 1958

WHITE BEANS

<u>COOPERATOR</u>	<u>ACRES</u>	<u>CWT/ACRE</u>	<u>\$/ACRE</u>
Almy, I.	163	15.3	\$ 85.95
Benkert Bros.	30	3.5	\$ 22.87
Boese, D.	94	8.3	\$ 56.86
Boese, M.	128	7.1	\$ 55.21
Bowden Bros.	69	20.1	\$114.42
Bremor, G.	30	10.0	\$ 79.79
Bramer, E.	20	16.4	\$127.92
Bruns, J.	22	12.5	\$ 89.25
Gosen, G.	115	8.7	\$ 60.68
Gosen, H.	24	9.5	\$ 73.82
Hart, M.	87	7.5	\$ 50.98
Pagal, C.	42	9.7	\$ 76.02
Peaphon, A.	32	5.4	\$ 37.80
Schramke, C.	40	8.4	\$ 39.80
Schluckebier, A.	38	11.0	\$ 75.42
<hr/> TOTALS:	<hr/> 932	<hr/> ave. 10.2	<hr/> ave. \$ 69.82

CROP YIELDS - 1968

BARLEY

<u>COOPERATOR</u>	<u>ACRES</u>	<u>BU./ACRE</u>	<u>\$/ACRE</u>
Almy, L.	56	56*	Not Harvested
Bosse, M.	90	56	\$ 47.95
Bowden Bros.	67	47	\$ 46.95
Bremer, G.	44	54	\$ 47.46
Bremer, R.	40	52	\$ 48.13
Brown, J.	12	56*	Not Harvested
Gempel, J.	12	56*	Not Harvested
Gosen, C.	88	56*	Not Harvested
Gosen, H.	24	56*	Not Harvested
Pagal, C.	28	56*	Not Harvested
Peaphon, A.	93	70	\$ 91.14
Schramke, C.	20	56*	Not Harvested
<hr/>			
TOTALS:	574	ave. 56	ave. \$ 56.33

* average estimated yield

CROP YIELDS - 1968

CORN

<u>COOPERATOR</u>	<u>ACRES</u>	<u>BU/ACRE</u>	<u>\$/ACRE</u>
Almy, I.	58	77	Not Sold
Boese, D.	138	79	\$ 66.80
Boese, M.	145	105	\$ 94.78
Bremer, R.	40	46	\$ 42.77
Brans, J.	22	55	\$ 55.34
Gosen, G.	50	78	\$ 64.93
Hart, M.	27	82	Not Sold
Peaphon, A.	56	68	\$ 59.84
Schramke, C.	20	50	\$ 40.34
Schluckebier, A.	30	82	Not Sold
Wasmiller, W.	15	46	\$ 42.65
TOTALS:	601	ave. 70	ave. \$ 58.43

OATS

<u>COOPERATOR</u>	<u>ACRES</u>	<u>BU/ACRE</u>	<u>\$/ACRE</u>
Bremer, R.	16	56	\$ 27.78

CROP YIELDS - 1968

SOYBEANS

<u>COOPERATOR</u>	<u>ACRES</u>	<u>BU/ACRE</u>	<u>\$/ACRE</u>
Benkert Bros.	12	31*	Not Harvested
Boese, D.	70	27	\$ 60.45
Bowden Bros.	32	33	\$ 74.96
Bremer, R.	18	28	\$ 64.33
Fawcett, H.	50	30	\$ 67.64
Gempel, J.	32	34	\$ 75.34
Gosen, G.	35	39	\$ 93.04
Hart, M.	39	34	\$ 72.99
Peaphon, A.	62	34	\$ 82.96
Weigl, R.	48	23	\$ 51.17
TOTALS:	398	ave. 31	ave. \$ 71.43

MILLET

<u>COOPERATOR</u>	<u>ACRES</u>	<u>BU/ACRE</u>	<u>\$/ACRE</u>
Boese, D.	75	est. 50	Not Harvested

BUCKWHEAT

<u>COOPERATOR</u>	<u>ACRES</u>	<u>BU/ACRE</u>	<u>\$/ACRE</u>
Bowden Bros.	13	est. 50	Not Harvested
Weigl, R.	27	est. 50	Not Harvested

CROP YIELDS - 1968

WHEAT

<u>COOPERATOR</u>	<u>ACRES</u>	<u>BU/ACRE</u>	<u>\$/ACRE</u>
Bowden Bros.	50	46*	Not Harvested
Bremer, G.	43	39	\$ 43.19
Bremer, R.	27	44	\$ 44.44
Gempel, J.	10	42	\$ 42.86
Peaphon, A.	52	50	\$ 52.00
Schrems, G.	38	55	\$ 57.63
Weigl, R.	5	46*	Not Harvested
<hr/>			
TOTALS:	225	ave. 46	ave. \$ 48.02

* estimated yield from average

SUGAR BEETS

<u>COOPERATOR</u>	<u>ACRES</u>	<u>TONS/ACRE</u>	<u>GROSS \$/ACRE</u>
Almy, I.	77	22.2	\$ 188.17
Gosen, H.	24	24.6	\$ 232.38
Schluckebier	36	24.5	\$ 212.37
<hr/>			
TOTALS:	137	ave. 23.8	ave. \$ 210.97

C. Collection and Receipts.

1. Annual Specimens.

None.

2. Refuge Herbarium.

Wildlife Aid Sikkenga collected additional specimens to replace old material in the herbarium in conjunction with the transect work.

D. Control of Vegetation.

Weed control on refuge croplands were completed by the farmers, at their expense, as a condition of the cooperative farming agreement, being limited to use of herbicides and the approved list.

Chemical weed control of willows on dikes and weeds and brush along roads, fence lines, and ditches was completed by refuge personnel in June and July, using mixture of 2,4,D and 2,4,5-T.

Mechanical weed control in field grass strips was accomplished by periodic mowing by refuge personnel.

E. Planned Burning.

None.

F. Fires.

No fires occurred on refuge lands in 1968.

IV. RESOURCE MANAGEMENT

A. Grazing.

None in 1968.

B. Haying.

None in 1968.

C. Fur Harvest.

The 1967-68 trapping season ended on January 31, 1968. Three trappers removed a total of 550 muskrats during the season. All furs were sold by the trappers for the best price they could get and 40 percent of the proceeds was paid to the Bureau as the refuge share. Trappers received a total of \$547.50 for the furs, an average price of \$0.995 each, and the refuge share was \$219.00.

All pelts were checked by Assistant Refuge Manager Hutchinson and sexed and aged. Results were as follows:

<u>Adult</u>		<u>Immature</u>	
<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
68	88	227	167

From this age and sex ratios were computed as 1 adult : 2.5 immatures and 1 female : 1.2 males.

The annual muskrat house count, covering Pools 1 and 2 and the Shiawassee River marshes was completed in November to arrive at an estimate of the current muskrat population. Information gathered on the count indicated a population of 3,000 muskrats, a slight increase over 1967 estimates.

The Michigan trapping season for muskrats extended from November 15, 1968 through January 31, 1969, but a special extension of the season through March 31 was authorized for refuge marshes. Trapping permits were issued to three local trappers for removal of muskrats during this season. As of December 31, the trappers have removed four musance beavers, 718 muskrats, 3 raccoons, 1 skunk and 1 fox.

- D. Timber Removal. None.
- E. Commercial Fishing. None.
- F. Total Cash Receipts - C.Y. 1968.

<u>Source of Revenue</u>	
Fur Harvest Receipts	\$ 219.00
Public Hunting Program:	
User fees	1,894.00
Decoy rental fees	568.00
Miscellaneous Receipts	50.00
Total Cash Receipts:	\$2,731.00

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Wildlife Management Study No. 1

This five year study was completed in 1968. Principal objectives of the study include life history, nesting phenology, and success of the refuge Canada goose nesting flock. Other investigations included are correlation of populations with changes in nesting habitat, determination of mortality, and migration behavior.

The first migrant geese were observed on March 5 and numbers increased until the peak of 15,000 was reached on March 21. As migrants moved out the nesting flock stabilized at 700 birds in April. Birds of the nesting flock, identified by color leg bands, generally segregated themselves from the migrants during this period.

Pre-nesting activity was first observed the second week of March, shortly after the geese arrived, and first nesting activity was observed on March 23, with several pairs on islands in Pool 1 and two pairs in nesting tubs in the old goose pen.

The first nesting survey was conducted on April 26, 29, and 30 with a total of 55 nests located at that time. The 55 nests contained a total of 304 eggs, with average clutch size 5.5 eggs, which compares with average size in previous years. Nesting islands again accounted for the majority of nest sites, with 46 nests, or 84% of the total. Additional nests were located on muskrat houses (6 = 11%), nesting tub (2 = 3%), and other (1 = 2%). Evidence of goose nesting activity spreading out from the pool areas was observed on May 13 when a goose with a brood of 5 goslings was observed crossing State Highway M-13 just south of the Cass River bridge.

A variety of nesting cover was utilized including bare ground. In all cases the dominant vegetation type provided the nesting materials. Nests on bare ground consisted primarily of down for nest material.

Of the 55 nests, 34 were located in Pool 1a, 19 in Pool 1B, and 2 were found in Pool 2.

The first broods hatched on May 6, almost three weeks later than in 1967. One indication of hatching success was obtained when on May 24 130 goslings were counted in the Pool 1 area. This gives a minimum hatching success 43%. The nest re-survey was conducted on May 31 and June 3 and it was found that of the 304 eggs, 267 had successfully hatched, a success rate of 87.8%. No evidence of nest predation was present at this time.

Drive traps were constructed in Farm Units 1A and 1C on June 11. On the following day a drive was conducted in Farm Unit 1C and 63 goslings were trapped and banded. Additional drives were conducted in Farm Unit 1A on June 13 with 80 goslings banded and on June 14, again in Farm Unit 1A, with an additional 17 goslings banded. During the remainder of June and in early July an additional 18 goslings were captured and banded. All goslings were banded with the standard numbered band on one leg and a orange and white plastic band on the opposite leg. Of the 178 goslings banded, 101 were females and 77 were males.

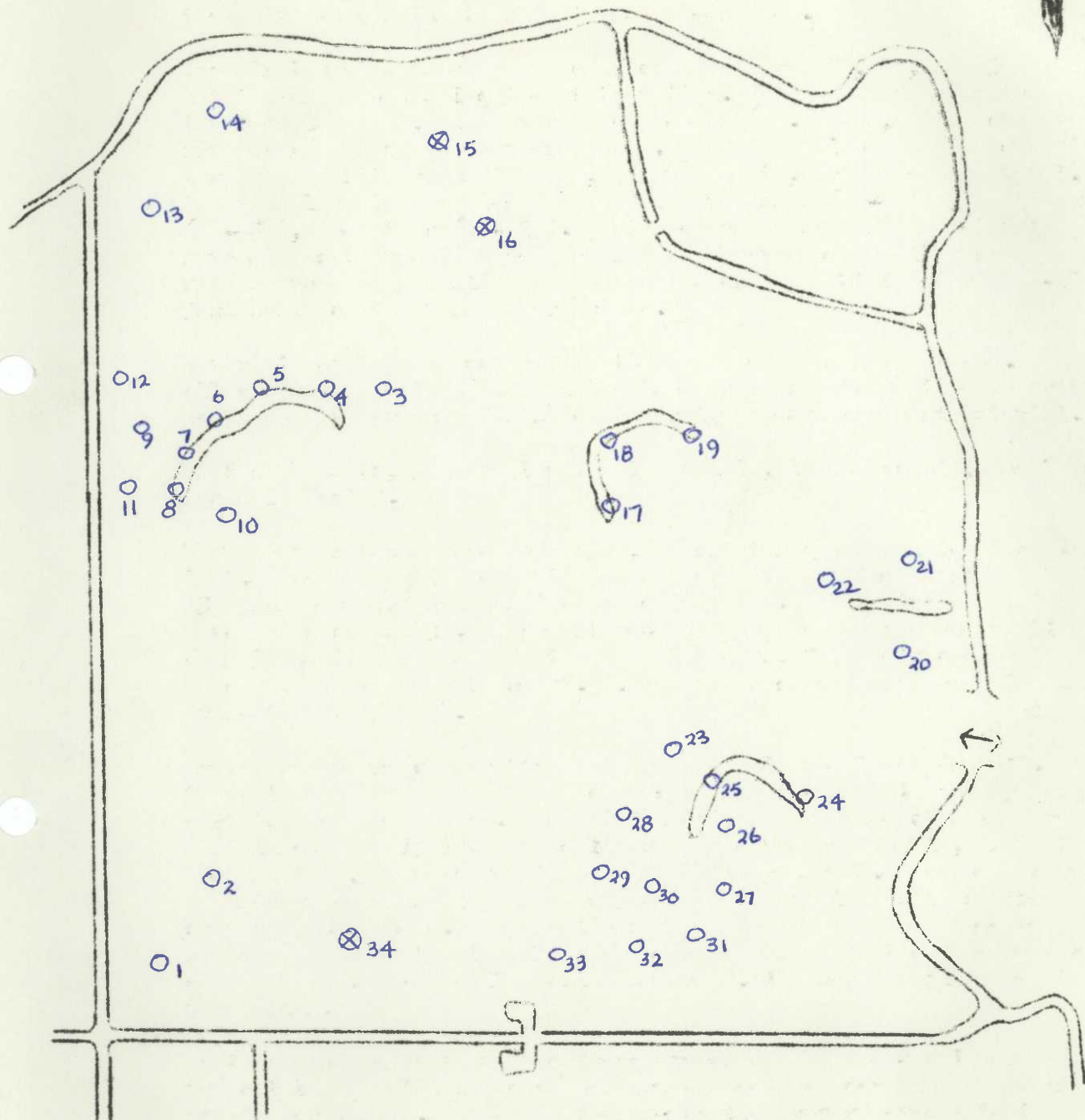
Most feeding activity of the goose broods was in the croplands adjacent to Pool 1 as goslings fed on new green shoots of corn and beans as the plants germinated. Later in the summer the broods moved into the marsh areas of the pools.

The final report on this study is to be submitted within the next few months.

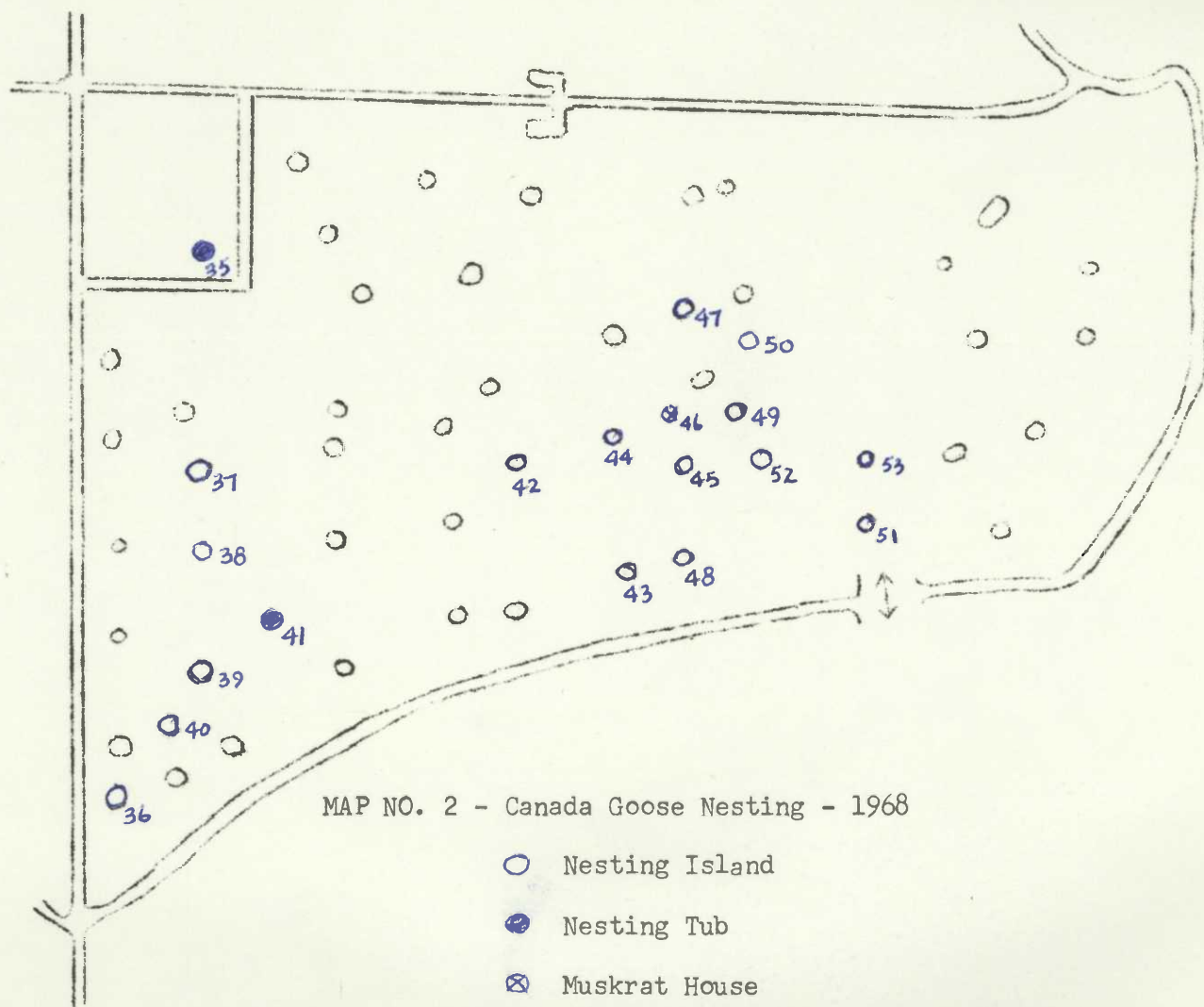
MAP NO. 1 - Canada Goose Nesting - 1968

○ Nesting Island

⊗ Muskrat House



Pool 1A

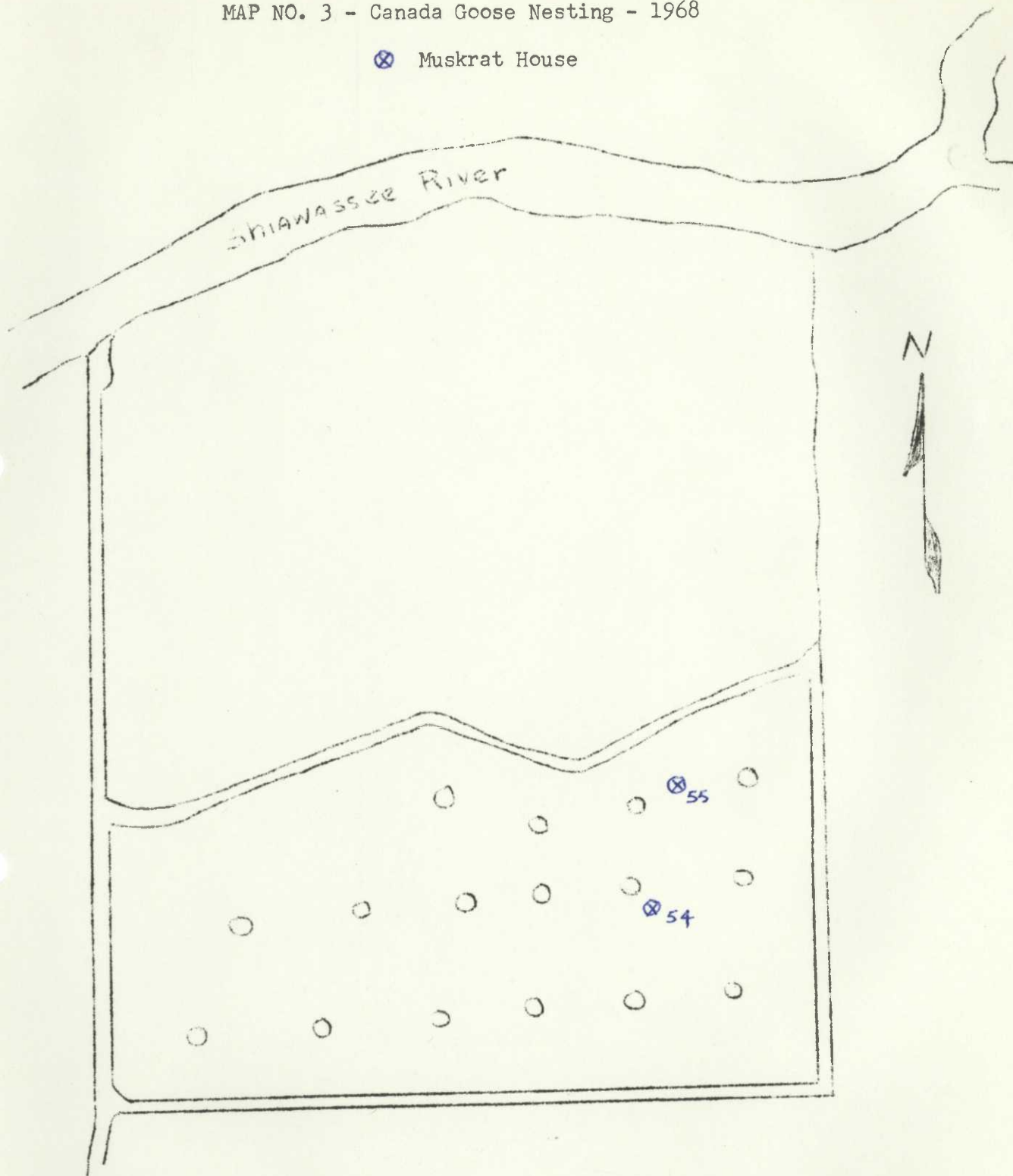


N

Pool 1b

MAP NO. 3 - Canada Goose Nesting - 1968

⊗ Muskrat House



Pool 2

B. Wildlife Management Study No. 2

1968 also constitutes the termination year of the five year study of the ecology of the Whistling swan on the Shiawassee Refuge. Primary objectives of the study are to determine habitat preferences, migration patterns, morphological characteristics of species, sex and age classes, origin and extent of mortality, to provide improved trapping and marking methods, and to correlate current and future land management practices with annual population numbers.

In 1968, the first migrants arrived on the refuge on March 17 when 37 swans were observed feeding in a flooded winter wheat field in Farm Unit 1A. The peak population of 2,000 swans was recorded on April 4, and trapping attempts were then initiated. The last observation was recorded of a single individual in Mid-June.

Principal feeding and loafing areas were again in Crop Unit 1, but heavy use was also made of Farm Unit 9B for the first time in 1968. Feeding was confined mainly to flooded corn fields but swans were also observed feeding on flooded winter wheat and sugar beet residues. Swans generally were segregated from the geese in their feeding activities in the flooded fields.

A large swim-in trap was constructed in a flooded portion of Farm Unit 1B in early April in an area that was being heavily used by swans, and a cannon-net trap was set up along the grass strip of a field road in Crop Unit 1 that was being used as a loafing site. Although large numbers of swans continued to feed around the swim-in trap, none entered the trap, and loafing use of the road ceased after the cannon net trap was set up.

On April 15, only six swans remained on the refuge, and all were captured with the cannon net trap on the permanent Pool 1A banding site. All six were banded and color-marked prior to release.

Reported sightings of color-marked swans were recieved from near Green Bay, Wisconsin on April 16, a report of three "red swans", and a report from near Mt. Pleasant, Michigan of a single "pink swan" on April 25.

The presence of obviously sick swans was first observed on April 1. The swans were weak and easily caught. Two specimens that died after capture were taken to the University of Michigan for autopsy by Dr. Archibald Cowan of the School of "atural Resources. His report stated the cause of death for both birds was lead poisoning. This slight mortality occurs each spring and it has been assumed that the swans pick up lead on the wintering areas.

The final report on this study is to be submitted at an early date.

1968 - WHISTLING SWAN - MORPHOLOGICAL CHARACTERISTICS AND OBSERVATIONS

Bird No.	68-01	68-02	68-03	68-04	68-05	68-06
<u>Band Number</u>	<u>509-20730</u>	<u>509-20731</u>	<u>509-20732</u>	<u>509-20733</u>	<u>509-20734</u>	<u>509-20735</u>
<u>Date</u>	4/15/68	4/15/68	4/15/68	4/15/68	4/15/68	4/15/68
<u>Total Weight (lbs. - oz.)</u>	10-12	10-8	16-12	18-8	10-12	10-12
<u>Age *</u>	Immature	Adult	Adult	Adult	Immature	Immature
<u>Bursa of Fabricus</u>	Absent	Absent	Absent	Absent	Present	Present
1. <u>Depth (mm)</u>	-	-	-	-	10	6.6
<u>Sex</u>	Female	Female	Female	Female	Female	Female
<u>Oviduct</u>	Open	Open	Open	Open	Closed	Closed
<u>Penis</u>						
1. <u>Diameter (mm)</u>	-	-	-	-	-	0
2. <u>Length (mm)</u>	-	-	-	-	-	-
3. <u>Small & Corkscrew</u>	-	-	-	-	-	-
4. <u>Sheathed</u>	-	-	-	-	-	-
5. <u>Color (pink)</u>	-	-	-	-	-	-
6. <u>Appearance (wrinkled)</u>	-	-	-	-	-	-
<u>Sphincter Muscle</u>						
1. <u>Diameter (mm)</u>	18.4	14.6	24.4	19.1	17.3	17.0
2. <u>Shape</u>	Convex	Convex	Convex	Convex	Flat	Flat
3. <u>Color (flesh pink)</u>	Yes	Yes	Yes	Yes	Yes	Yes
<u>Wing & Primary Feathers</u>						
1. <u>Wing length (cm)</u>	50.7	57.0	55.0	56.2	49.1	50.2
2. <u>Length 1st primary ** (cm)</u>	32.5	41.0	37.6	43.4	37.9	34.5
3. <u>Max. width 1st primary ***** (mm)</u>	25.3	35.1	35.0	31.0	33.0	34.0
4. <u>Wear 1st primary ***</u>	Pointed	Obtuse	Obtuse	Pointed	Pointed	Pointed
<u>Spur Wing</u>						
1. <u>Feathered or bare</u>	Feathered	Feathered	Feathered	Feathered	Feathered	Feathered
2. <u>Knobby or smooth</u>	Knobby	Knobby	Smooth	Knobby	Smooth	Smooth

Bird No.	68-01	68-02	68-03	68-04	68-05	68-06
<u>Breast & Belly Feathers</u>						
1. Average width (mm)	26.4	26.0	26.8	23.2	23.7	26.1
<u>Tail Feathers</u>						
1. No. Rectrices	-	-	-	-	-	-
2. Notched Rectrices	Unnotched	Unnotched	Unnotched	Unnotched	Notched	Unnotched
3. Length longest rectrice (cm)	15.0	17.5	18.2	20.5	14.0	16.0
4. Median width vane of longest rectrice (mm)	46.8	45.4	48.6	43.3	58.4	50.0
<u>The Legs</u>						
1. Dia. Tarsus mid-point (cm) ***	19.2	21.2	20.9	23.3	19.2	20.8
2. Total length Tarsus (cm)	18.9	9.9	11.0	11.2	10.6	9.6
<u>The Bill</u>						
1. Total length (mm)	93.2	91.8	90.9	97.6	89.2	87.9
2. Width of bill at nostrils (mm)	30.6	32.3	30.7	34.0	32.5	33.0
3. Width of nail (mm)	19.9	22.4	18.1	20.5	15.8	17.7
4. Distance of nostril from tip of bill (mm)	39.8	41.4	40.8	45.8	35.1	39.0
5. Yellow spot in lore	Present	Present	Present	Present	Absent	Absent
6. Area of yellow spot (mm ²)	98.0	198.0	176.0	90.0	-	-
7. Color of bill	Blotched	Black	Black	Black	Black	Black
<u>General Characteristics</u>						
1. Body temperature	104.1	104.6	106.0	107.0	108.2	107.0
2. Color of head & neck	Gray	White	White	White	Gray	Gray

* Immature = Up to 1 year of age
 Sub-adult = 1-3 years of age
 Adult = 3+ years of age

** Distal Primary

*** Wear determined from tips of primaries

*** Diameter taken at lateral dimension of Tarsus

**** This measurement made as median width in past years

C. Marsh Transect Surveys.

The nine line-intercept transects established in 1964 were surveyed by Biological Technician Sikkenga, assisted by Hutchinson, during August, following established guidelines and techniques.

Quadrats on the old transects established in 1956 were also surveyed, and photographed in August and early September. Slides taken were added to the transect slide file.

All data from the marsh transects surveys has been compiled and graphed and is in the refuge files. Summary information was included in the final report of the Biological Technician.

D. Banding.

Banding operations were conducted between April 5 and October 21, 1968. Trapping was accomplished through use of floating cage traps and cannon net traps.

Duck banding success was hampered by low duck populations early in the summer, and the usual difficulty in baiting ducks later in competition with the abundance of foods available in croplands and marshes.

Goose banding was limited to spring and fall migration periods plus drive trapping the annual gosling production.

A total of 890 ducks, 586 Canada geese, 6 Whistling swans and 41 mourning doves was banded during the year. Complete banding data is contained in the following table.

<u>Species</u>	<u>AHY</u>		<u>HY</u>		<u>Local</u>		<u>Unk.</u>	<u>Total</u>
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>		
Mallard	144	224	135	124	2	3	1	633
Black duck	30	21	23	13	-	-	-	87
Pintail	-	2	1	-	-	-	1	4
G. W. Teal	5	3	1	2	-	-	-	11
B. W. Teal	16	11	20	16	-	-	-	64
Wood duck	23	10	20	31	2	5	-	91
Sub-total	218	271	200	186	5	8	2	890
Canada goose	152	126	50	80	77	101	-	586
Whistling swan	-	6	-	-	-	-	-	6
Grand Total	370	403	250	266	82	109	2	1482

E. Sugar Beets Utilization by Canada Geese.

Sugar beets are probably the most important cash crop in the Saginaw Valley but has proved a problem crop in the refuge operations. A determination was made to eliminate beets from refuge lands, effective with the 1968 crop season, and farm permittees were so advised. A delegation from the Michigan Sugar Company and the Farmers and Merchants Beet Sugar Association visited the Refuge Division in the Regional Office and convinced refuge division personnel that since Canada geese had been feeding on sugar beets residue at Shiawassee, experimental beet production should be continued. The objective of this study then is to justify continued production of sugar beets at Shiawassee Refuge, with special emphasis on actual utilization of the beets by geese, determination of food values of beets, if any, and harvest methods to furnish better goose utilization as compared to increased refuge road maintenance costs because of road damage during the harvest period.

Since Canada geese were first observed feeding on sugar beet residues at Shiawassee Refuge in 1964, each year has shown increased use of harvested sugar beet fields by geese with observed feeding on beet chips left after the harvest, as well as feeding on the crown of the beet as soon as the tops were beaten and shredded. Our observations indicate the specific location of the beet fields inside the refuge farming units has been an indicator as to amount of use. Specifically - fields located within the interior of the refuge near or adjacent to the marshes will receive heavy use while perimeter fields and private lands will be little used by the geese.

Three farmers raised a crop of sugar beets on refuge lands in 1968. There were 36 acres in Farm Unit 1A, 24 acres in Farm Unit 3B, 56 acres in Farm Unit 7A and 21 acres in Farm Unit 8. An additional 20 acres of beets planted in Farm Unit 2B were plowed down after root rot developed in June.

The first sugar beets harvested in this area were taken from private lands on September 30. By October 11 several fields had been harvested from private lands and on this date the first goose use of sugar beets was observed in a field north of Littlejohn Road, just east of the refuge boundary. A maximum number of 1500 geese used this field for three days and then only 30 - 50 geese were feeding there daily for another week. About this time beet harvest was started on Farm Unit 7A and the permittee farmer reported a few geese on that field. The harvest was completed on Farm Units 1A and 3B between October 17 and 21 and all goose use of beets on Farm Unit 7A ceased at this time. All other feeding of geese on browse and grain stubble on refuge lands also stopped at that time. Geese moved into Farm Unit 1A and 3B as soon as the harvest operations began and ignored the harvest operation that was being carried out in the area, concentrating on the areas of the fields where harvest had been completed.

As one phase of the study, it had been determined that a portion of the refuge share of the beets would be lifted by the beet harvester and spilled out on the ground. This was done on a total of eight acres, six acres in Farm Unit 1A and 2 acres in Farm Unit 3B. Normal beet harvest operations were conducted on Farm Units 7A and 8.

Geese started feeding on the whole beets immediately and within three days 12,000 geese were concentrated on Farm Unit 1A and 3,000 on Farm Unit 3B. Within ten days the geese had consumed an estimated 95% of the whole beets in Farm Unit 1A, an unbelievable 140 tons of sugar beets. It required a little longer but eventually 100% of the beets had been eaten on the two fields, a total of 196 tons. While the geese were feeding on beets, they fed on beets exclusively and all feeding activity on browse plants, grains and corn ceased.

One result of this experimental handling of the refuge share of the beet crop was an accusation by the local Game Management Agent that we were in violation of baiting regulations.

The weather during the beet harvest this year was abnormal in that an extended warm period, without significant precipitation, permitted a smooth harvest operation without a stop from beginning to end. As a result of this unusual weather, road damage from the operation was at a minimum. This destroyed our major objection to sugar beet production on refuge lands for this one year.

The study is to be continued for at least one more year.

VI. PUBLIC RELATIONS

A. Recreational Uses.

More and more people "discover" the refuge each year and demands for public recreational use continues to increase. While the demand for the opportunity to see the wildlife from the family automobile remains high, we have found that a great majority of local people will walk and are grateful for the limited facilities we have to offer on our nature trail. Use of the nature trail was heavy from the time of the first warm week-end in March until the mosquitoes took over in June and July. Periodic spot checks showed as many as 70 cars parked at the start of the trail on a nice Sunday.

The guided automobile tour, conducted during the spring migration period, continues to be popular and this year individuals were coming from as far away as Detroit to see the geese and swans. As has been mentioned many times in previous years, the only limitation there appears to be on numbers of people who would take the guided tour are physical limitations on numbers we can accommodate, and road conditions that often do not permit travel by private automobile. On the peak Sunday, April 7, 173 carloads of people took the guided tour, but at least an equal number of cars turned away because of congested parking problems and the thought of a long wait for their turn.

During the latter part of March and most of April the birds cooperated and several thousand geese and 500 swans concentrated in flooded corn on Farm Unit 9B, adjacent to the refuge boundary and along a county road. This offered many car loads of people to "see the wildlife" from their cars, without taking a guided tour.

Use of the nature trail dropped off with the advent of the mosquito season in June and July, but became popular again early in the fall and received heavy use up to the time the hunting season opened.

The camping area on Green Island, operated by the Boy Scout Council, was used to capacity during the camping season. This is a simple group type camp for scout troops in the area and has afforded a camping opportunity for many boys from the "inner city" that they might otherwise never enjoyed.

B. Refuge Visitors.

<u>Date</u>	<u>Name</u>	<u>Affiliation</u>	<u>Purpose</u>
Jan. 3	W. H. Phillips	Wildlife Supply Co.	Farm pumps
3	T. N. Usher	Wildlife Supply Co.	Farm pumps
3	G. R. McMaster	Action Engineering Co.	Farm pumps
Feb. 6	Harold Dykema	MCD, St. Charles	Water Management
9	Marc Wesley	WNEM-TV, Saginaw	TV films - deer
11	John Wilbrecht	FWS, Seney Refuge	Student interviews
14	Wm. C. Bair	FWS, Ottawa Refuge	Corn transfer
16	Marvin Johnson	MCD, Rose Lake	Public hunting
16	Harold Dykema	MCD, St. Charles	Public hunting
19	Clair T. Rollings	FWS, Refuges, Mpls. Minn.	Sugar beets
Mar. 5	R. Jorgenson	FWS, Realty, Mpls. Minn.	Land acquisition
5	Frank McAnnear	U. S. Dept. of Justice	Land acquisition
15	Douglas Cammell	F.B.I., Saginaw	Investigate B & E
15	James Miller	Mich. State Police	Investigate B & E
28	Vic Jansen	MCD, Game Division	Visit
Apr. 7	Wayne Kemp	WJRT-TV, Flint, Mich.	TV films - geese
7	Gary Bee	WCGN, Mt. Pleasant, Mich.	Tape radio interview
15	Bill Shake	FWS, Wildlife Services	Visit
19	Clyde Allison	MCD, I & E, Lansing	Movie on geese
30	Ed Mikula	MCD, Lansing	Public hunting
May 10	Nelson Dornbusch	FWS, Ottawa Refuge	Equipment transfer
20	Marvin Johnson	MCD, Rose Lake	Duck banding, etc.
27	Ray Vasold	Sag. Co. Extesion Agent	Visit
June 4	J. R. Wright	FWS, Engineering, Mpls.	Pool 3 construction
4	Hugh Beaver	FWS, Engineering, Boston	Pool 3 construction
6	F. A. Carpenter	FWS, Refuges, Mpls., Minn.	Inspection
6	J. B. Monnie	FWS, Refuges, Mpls., Minn.	Inspection
July 2	John Ramsour	FWS, Engineering, Mpls.	Pool 3 construction
2	D. Young	FWS, Ottawa Refuge	Visit

<u>Date</u>	<u>Name</u>	<u>Affiliation</u>	<u>Purpose</u>
July 11	C. J. Johnston	FWS, Refuges, Mpls., Minn.	Interp. program
11	Marv Duncan	FWS, Refuges, Mpls., Minn.	Interp. program
Aug. 1	John Ramsour	FWS, Engineering, Mpls.	Pool 3 dike
7	T. Sommers	Bridgeport High School	Vocational program
7	R. Borg	Bridgeport High School	Planning
Sept. 10	Don Young	FWS, Ottawa Refuge	Corn transfer
10	John Ramsour	FWS, Engineering, Mpls.	Pool 3 dike
19	Jerry Martz	MCD, Rose Lake	Visit
Oct. 14	Ken Peterson	Outdoors Ed., Flint Journal	Public hunting program
31	Earl Eliason	FWS, Realty, Mpls., Minn.	Rent survey
31	M. Kerschbaum	U. S. Army	Visit
Nov. 21	Ivan Keston	MCD, C.O., Flint, Mich.	Visit
21	Tom Bell	Genesee Co. Sheriff	Visit
Dec. 5	Merle Raber	MCD, Lansing	Visit
5	Andy Ammonn	MCD, Lansing	Visit
11	Art Graves	Amateur Archeologist	Visit
17	George Orlich	FWS, Seney Refuge	Corn transfer
17	Anthony Sluga	U. S. Dept. of Justice	Land acquisition
23	Bill Hutchinson	U. S. Army	Visit
23	Jay Bellinger	FWS, Agassiz Refuge	Visit

Periodic visitors included USGMA's Cross and Fuchs, Michigan Conservation Officers Harris and Ankney, and cooperator farmers.

C. Refuge Participation.

1. Refuge Tours.

March	18 -	University of Michigan Wildlife Management Students. (Frye and Hutchinson - 30)
	28 -	Arthur Hill High School Biology Club. (Hutchinson - 80)
	28 -	St. Thomas Aquinas School 4th Grade. (Poma - 30)
	30 -	Midland Nature Club. (Frye - 186)
	30 -	Lansing Audubon Club. (Frye - 80)
April	2 -	St. Pauls Seminary, Saginaw. (Hutchinson - 35)
	3 -	Freeland Elementary School. (Poma - 15)
	5 -	St. Thomas Aquinas School. (Poma - 35)
	8 -	Hemlock Elementary School. (Hutchinson - 102)

- April 8 - St. Thomas Aquinas School 7th Grade. (Poma - 25)
- 9 - Bullock Creek School 4th Grade. (Frye and Hutchinson - 106)
- 10 - Hemlock High School Biology Class. (Poma - 65)
- 11 - Hemlock High School Advanced Biology Class. (Poma - 40)
- 15 - St. Anthony School, Fisherville 7th & 8th Grades. (Frye - 40)
- 16 - Hoyt School 1st Grade. (Poma - 53)
- 23 - St. Stephens School 5th Grade. (Poma - 84)
- 26 - St. Mary's School 7th Grade. (Poma - 42)
- July 1 - Webber School Summer Program. (Poma - 49)
- 1 - St. Vincent's Orphanage. (Hutchinson - 40)
- 11 - Frankenmuth High School Summer Program. (Poma - 14)
- August 1 - St. Clair and Macomb Counties 4-H Club Conservation Award Winners. (Frye - 36)
- October 7 - Bridgeport Elementary School 6th Grade. (Hutchinson - 38)
- 8 - Saginaw Woman's Club. (Frye - 50)
- 8 - Saginaw Girl Scouts. (Poma - 19)
- 9 - Senior Citizens Club, Flint. (Frye and Poma - 69)
- 10 - Bridgeport High School Occupational Surveys Class. (Frye and Hutchinson - 55)

2. Meetings.

- March 5 - Frye, with Regional Realty Supervisor Jorgenson and U. S. Department of Justice Attorney Frank McAnnear, met with attorney and land appraisers regarding trial dates for condemnation proceedings for Tract 21a.
- 8 - Frye met with representatives of Michigan Sugar Company and Farmers and Merchants Beet Sugar Association to explain trial period for refuge beet production and crop divisions.

- May 29 - Frye attended meeting called by Saginaw County Drain Commissioner on Saginaw Valley Flood Control Proposal.
- December 10 - Frye attended meeting of Spaulding Township Board regarding needed road improvements to Curtis Road to handle increasing traffic as a result of refuge public use.
- December 17 - Frye, with U. S. Department of Justice Attorney Anthony Sluga, attended pre-trial conference on Tract 21a before Judge Roth in Bay City Federal Court.

During the year Frye attended monthly meetings of Saginaw County Agriculture Council, monthly meetings of Spaulding Township Planning Commission, and Spaulding Township Park Board. Periodic meetings were held with Soil Conservation Service personnel, Cooperative Extension Service, and farming cooperators. Clerk Poma served as Assistant Scoutmaster with his local troop and Biological Technician Robinson worked with a boys base ball team.

3. Slide Talks.

- January 14 - St. Mary's Men's Club, Swartz Creek. (Frye - 60)
- February 12 - Wildlife Seminar, University of Michigan. (Frye - 42)
- 13 - Wildlife Seminar, Michigan State University. (Frye - 16)
- 14 - Junior Industrial Executives Club. (Frye - 24)
- March 12 - Kaufman School P.T.A. (Frye - 154)
- 15 - Boy Scout Troop 313. (Poma - 25)
- 18 - Camp Fire Girls Council. (Frye - 54)
- 19 - Lions Club, Birch Run. (Hutchinson - 13)
- 26 - Freeland Elementary School. (Hutchinson - 13)
- 26 - Arthur Hill High School Biology Club. (Frye - 46)
- April 1 - Cass City Gun Club. (Hutchinson - 25)
- 2 - Boy Scout Troop 361, Midland. (Frye - 30)
- 5 - Parents Without Partners Club. (Frye - 80)

- April 22 - Boy Scout Troop 261, Midland. (Frye - 54)
- 26 - Michigan Ave. Baptist Church Father & Son
 Banquet. (Frye - 65)
- June 25 - Michigan Farm Bureau Womans Association.
 (Frye - 47)
- 26 - Webber School Summer Program. (Poma - 49)
- 27 - Saginaw County Township Officers Association.
 (Frye - 234)
- October 10 - Bridgeport High School Occupational Survey Class.
 (Frye - 55)
- 15 - St. Peter & Paul High School Conservation Club.
 (Frye - 38)
- December 6 - Bridgeport High School Occupational Survey Class.
 (Frye - 60)

4. Student Interviews.

Frye and Seney Refuge Manager John Wilbrecht conducted student interviews at University of Michigan on February 13 and at Michigan State University on February 14.

5. Radio and Television.

- February 9 - Five minute color film featuring concentrations
 of deer in Crop Unit 1 during 6:00 P.M. news
 program over WNEM-TV, Saginaw.
- April 7 - Five minute color film featuring refuge tours
 and Canada goose concentrations and taped inter-
 view with Frye shown during 11:00 P.M. news
 program on WJRT-TV, Flint.
- 10 - Five minute taped interview with Frye on refuge
 operations on "Wonderful Outdoors" program on
 WCEW-Radio, Midland.
- 21 - Five minute color film on geese and swans on the
 refuge shown during 11:00 P.M. news program over
 WJRT-TV, Flint.
- November 22 - 15 minute feature with color film and interview
 with Frye on refuge activities shown over WNEM-TV,
 Saginaw.

- December 14 - Color films and taped interview with Frye featuring bow hunting on the refuge shown on "Michigan Sportsman" program over WXYZ-TV, Detroit.
- 18 - "Michigan Sportsman" feature repeated over WNEM-TV, Saginaw.

6. Other.

- January 22-26 - Frye attended C.S.C. sponsored "Middle Management Institute" in Detroit.
- February 12 - Frye and Seney Refuge Manager John Wilbrecht participated on Conservation Panel for Student Government Day program at Buena Vista High School.
- 20 - Frye, with Clair Rollings, Land Use Specialist, R.O., met with Soil Science Professors at Michigan State University to discuss sugar beets culture and soils management.
- March 28 - Frye attended Michigan State Police Workshop on methods for handling unruly crowds at Caseville, Michigan.
- April 25 - Frye participated in Careers Day at S.S. Peter and Paul High School to discuss Careers in Conservation with 126 students.
- July 8 - Frye met with Vocational Instructors at Bridgeport High School to assist in setting up a Careers Course in Conservation.
- August 26-29 - Frye, Hutchinson and Elazo attended M&E Law Enforcement Workshop at Madison, Wisconsin.

D. Hunting.

1. Managed Goose Hunting.

The refuge managed goose hunt was conducted for the second year in 1968. In the area designated by the Michigan Conservation Department as the Saginaw County Goose Management Area, which includes the refuge, special regulations were again in force. These special regulations were goose hunting was limited to one-half days, from opening hour until noon; a daily bag and possession limit of one Canada goose, and hunting from October 22 through November 14. Again in 1968, only geese could be taken from refuge public hunting areas.

The hunting plan provided that 25 blinds, with two hunters per blind, would be available for each day of the 24 day season. All blinds were to be filled through advance mail applications as in 1967, whereby successful applicants would be guaranteed a blind reservation for the date specified on the application.

With a 24 day season, there were 600 blind reservations available to applicants. Application cards were distributed to Michigan Conservation Department field offices and sporting goods stores that sell hunting licenses in most of southern Michigan during the first week of September.

Applications were sorted and filed as received, and at that time duplicate or incomplete applications were disqualified. A total of only 699 valid applications for the 600 possible reservations was received prior to the cut-off date of October 1, as compared to 1,159 valid applications in 1967. Apparently the great "Coho Salmon Madness" that is epidemic in Michigan was an important factor in the lesser response to the goose hunting program this year. We also discovered at a much later date that the Detroit News media did not release the advance publicity on the program until three days before the cut-off date.

Drawings for blind reservations were completed in the refuge office on October 3 with Robert Young, Spaulding Township Supervisor, doing the honors, and successful applicants were notified by mailing the validated application card back to them. This year the 600 successful applicants represented 163 different cities and towns in Michigan.

The same general procedure as used in 1967 was continued this year to process the hunters each day. As hunters arrived at the refuge check station they were required to produce for inspection their hunting license, duck stamp, reservation card, and shotgun. If all was in order, one member of each hunting party was then instructed to draw one of the 25 numbered wooden balls to determine blind assignment. All blinds were assigned by luck of the draw only.

After collection of the user fee of \$2.00 per hunter, hunters were issued numbered arm bands corresponding to number of the assigned blind, were furnished a verbal review of all regulations, and then directed to their blinds. At the conclusion of the days hunt, all hunters were required to check out through the check station. At this time arm bands and decoys were returned, any geese taken were aged, sexed and weighed, and comments were solicited from each hunter regarding the program, etc.

There were "no-show" reservations every day of the season, and stand-by hunters drew for vacancies by order of sign-up. At no time during the season did it become necessary to turn any hunters

away, in fact all 25 blinds were filled on only one day during the season. 947 hunters used the public hunting area during the season, and of these 812 were hunters with advance reservations and 135 were stand-by hunters.

Prior to the October 22 opening date, some concern was evident that the goose kill might be excessive. Until October 20, several thousand geese were feeding on browse plants in the hunting areas, all around the blinds. After that date the geese stopped flying out of the refuge closed areas as the sugar beet harvest was completed on October 21 and the geese concentrated on the beets and stayed right in the closed area. This is the time we were accused of baiting geese by the local Game Management Agent.

Hunting was extremely slow during the entire 24 day season. Factors to account for this, in addition to the use of sugar beets by geese, were an abnormal weather pattern of warm sunny days, and shooting hours established by Michigan whereby legal opening time was 8:15 A.M., approximately 30 minutes after sunrise. When limited early morning flight activity of geese occurred, generally it was all over by the time hunters could legally shoot.

From the hunters standpoint, it was a poor hunting season. The peak goose population of 18,000 during most of the season was double the 1967 peak, but as the geese did not cooperate, the kill was way down. Only 29 geese were taken from the refuge hunting area, 27 from the State Game Area, and 11 from private lands in the area. Illegal goose hunting was a major problem in this area in 1967. The illegal goose kill before the season opened, afternoon hunting during the season, and hunting after the close of the season accounted for an additional kill estimate at 100 geese.

Of the 67 legally taken geese that were checked, only five were from the nesting flock. Identified by bands, these included two of the 1966 goslings, two of the 1967 goslings and one 1968 gosling.

Sex and age data from 56 geese checked through both the refuge and game area check stations indicate a ratio of 1 adult : 2.29 immatures.

Eight adult males (14.3%), nine adult females (16.1%), 14 immature males (25.0%) and 25 immature females (44.6%) were included in the total geese checked. The average goose weighed 8.75 pounds, with a weight range from a low of 5.5 pounds to the high of 13.75 pounds.

In spite of poor success, the vast majority of the hunters indicated they were satisfied with our program. Many hunters were repeaters from the 1967 season and most indicated they would apply for a permit in 1969. The main point remains that we furnished

the individual a place to hunt without the usual fierce competition present on state areas, and most hunters saw more geese than they had ever seen before, even if they did not have shooting. The one thing that is not universally accepted by the hunter, and by refuge personnel, is the requirement that a fee be charged, especially when a fee is not required on lands managed by the State of Michigan.

2. Deer Hunting.

The shotgun deer season in Michigan extended from November 15 through November 30 in 1968. The weather was miserable all through the season with heavy rains almost every day, and there was no snow on the ground at any time during the season. It was estimated from car counts during the 16 day bucks only season that 3,850 hunter days produced a legal kill of 100 deer and an illegal kill of 50 antlerless deer.

For the first time since establishment of the refuge, bow hunting for deer was permitted on refuge lands during the late season, December 1 through 31. The entire refuge was open to bow hunting, including the area of Crop Unit 1 and Pool 1 which has always been closed during the gun season. As a result of hunting pressure during the gun season, as estimated 500 deer were concentrated in the open fields of Crop Unit 1 on December 1. This is also the area where bow hunters concentrated. On the morning of the opening day there were 147 cars parked at the Curtis Road entrance to the refuge and more than 50 boats came across the Shiawassee River. When it got light enough to see, 800+ hunters suddenly found themselves looking at 500 deer, and vice-versa.

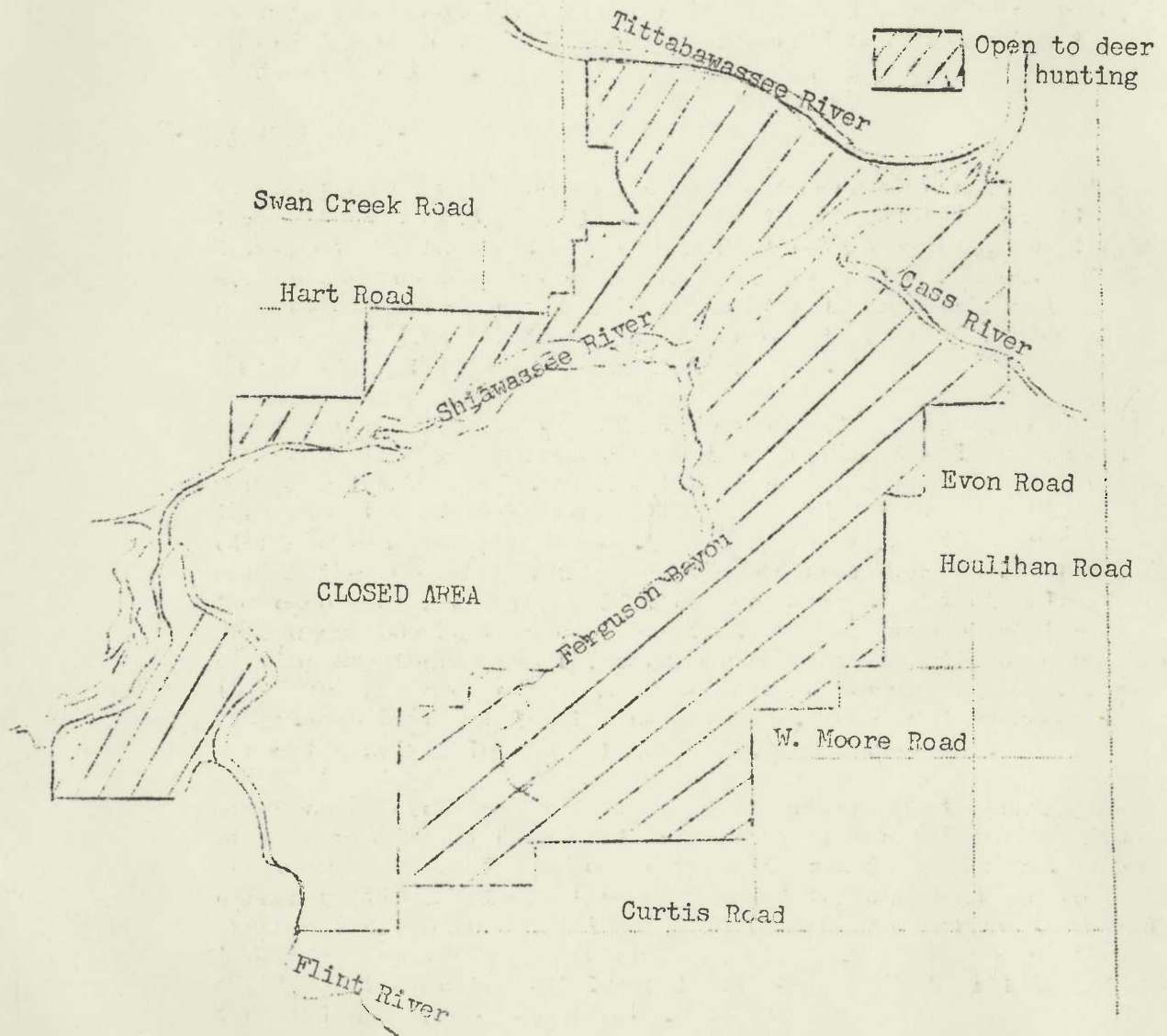
Pandemonium occurred at this point as archers went berserk and started running at deer while clouds of arrows filled the air. Never has such a display of poor sportsmanship been seen. This circus continued almost two hours until the deer managed to break out of the open fields into the woods and marshes. Seventy two deer were taken by archers on that day, by the end of the first eight days the total was 123, and the final kill is estimated at 150 deer for the season.

Few crippled deer have been observed as a result of the bow hunting because the bow hunters were apparently primarily meat hunters and were not at all reserved about tagging a deer shot by another.

On the plus side, we did accomplish one of the primary objectives of the hunt in that the deer herd is no longer concentrated in one small area of the refuge. The bow hunting activity has dispersed the deer over a wide area and at the end of the season, few deer are observed on the refuge.

SHIAWASSEE NATIONAL WILDLIFE REFUGE

LEGEND: _____ Refuge Boundary



During the 31 day bow season, an estimated 10,375 hunter days was recorded for bow hunters. Our observations indicate that actually there were few bow hunters, but many hunters with bows.

There has already been one inquiry from our Congressman about the "terrible slaughter of does and fawns".

E. Violations.

On March 15, a breaking and entering of the Service-office building at refuge headquarters was discovered when Hutchinson arrived for work. Entry had been gained by breaking out a window on the west side of the shop stall. Preliminary investigation by refuge personnel showed stolen items to be a 35mm Kodak Signet camera, one pair of 7X50 binoculars, a ring of keys, the spare wheel and tire from the station wagon, and the radio control head and mike out of the station wagon. An attempt had also been made to remove the spare wheel and tire and to remove the radio from the 1964 Dodge pickup. Thorough investigation by local F.B.I. Agent, Michigan State Police and Saginaw County Sheriff Department failed to produce any positive results and the break-in remains unsolved.

Breaking of padlocks to gain entrance to the refuge at Curtis and Evon Roads was a common problem all summer and no one was ever caught in the act.

On August 31 batteries were stolen from the dragline and electric cables from the arc welder while the units were at the job site on the north side of the river on Farm Unit 11A.

With the coming of snow in December, snowmobiles again have become a major problem and it is difficult to apprehend the violators without a snowmobile of our own.

The following violations were prosecuted during the year.

<u>Name</u>	<u>Violation</u>	<u>Court Action</u>
J. R. Miller	Refuge trespass	\$25.00 - 90 day probation (Federal Court)
G. M. Buege	Hunting on refuge	\$20.00 fine - \$13.00 Costs
B. J. Buege	Hunting on refuge	\$10.00 fine - \$13.00 Costs
C. L. Johnson	Hunting on refuge	\$25.00 fine - \$13.00 Costs
G. Marcony	Hunting on refuge	\$25.00 fine - \$13.00 Costs
D. E. Rosengard	Untagged deer	\$25.00 fine - \$21.00 Costs
J. F. Voss	Hunting geese out of season	\$25.00 fine - \$13.00 Costs
D. A. Baudoux	Hunting geese out of season	\$35.00 fine - \$13.00 Costs
T. W. Hollbrook	Hunting on refuge	\$25.00 fine - \$13.00 Costs
C. M. Clark	Hunting on refuge	\$10.00 fine - \$16.00 Costs
D. H. Petro	Hunting on refuge	\$10.00 fine - \$16.00 Costs
H. T. Slaght	Hunting without license	\$10.00 fine - \$16.00 Costs
B. B. Gray	Hunting on refuge	\$20.00 fine - \$18.00 Costs

F. Safety.

The station safety committee set up a schedule and regular staff safety meetings were held as follows.

- January 4 - Review of 1967 safety program; review of station safety plan; use of power tools. (Frye)
- February 7 - Motor vehicle operation, station safety record. (Frye)
- March 4 - Firearms safety. (Blazo)
- April 1 - Cannon-net trap safety; review of quarterly fire inspection. (Frye)
- May 6 - Defensive driving. (Poma)
- June 3 - Station Fire Plan; review of safety statistics. (Hutchinson)
- July 9 - Operation of heavy equipment near power lines. (Robinson)
- July 26 - Fire drill and use and operation of all types of fire extinguishers. (Shelley)
- September 10 - Film "Why Daddy", on fire protection. (Blazo)
- October 9 - Film "Fire Prevention", fire prevention week, and review of quarterly fire inspection. (Sikkenga)

All station personnel completed the National Safety Council Defensive Driving Course during the year.

On December 31, 1968, the station safety record stands at 5,585 days without a lost time accident. There has never been a lost time accident at Shiawassee Refuge.

VII. OTHER ITEMS

A. Trips.

- February 12-14 - Frye to Ann Arbor and East Lansing to conduct student interviews.
- April 20 to May 19 - Hutchinson attended Refuge Manager Training School at Arden Hills, Minnesota.
- May 22 - Frye and Robinson to Army Missile Plant, Warren, Mich. to screen excess property.

Several trips were made during the year to the Detroit Tank Plant and Selfridge AFB to screen or pick up excess property items.

B. Personnel.

William H. Hutchinson EOD as Refuge Manager GS-5 on January 2, 1968, and departed on Military Furlough on November 5, 1968. Bill, a graduate of Michigan State University, was just getting his feet on the ground after being married in June when the draft grabbed him. He is presently completing his basic training at Fort Knox, Kentucky.

David I. Hoff EOD as Refuge Manager, GS-7, on November 8, 1968. Dave is a graduate of South Dakota State University, with two years work with the Pacific Program of the National Museum in the Central Pacific islands. He is also a newlywed.

C. Photographs.

Appended photographs were taken with refuge equipment and processed in the combination office bathroom - darkroom as it was available.

D. Credits.

It has only been because of the excellent cooperation, enthusiasm, and dedication displayed by all staff personnel that 1968 has been a year of accomplishment. Again an impossible job has been completed in spite of the obstacles of shortage of funds and extra work loads from floods, and public hunting programs. A grateful word of thanks to the crew for their extra efforts to make the job a little less difficult.

SIGNATURE PAGE

Submitted by:

John R. Frye
(Signature)
John R. Frye
Refuge Manager
Title

Date: January 17, 1969

Approved, Regional Office:

Date: JAN 29 1969

James R. Monnie
(Signature)

ASST Regional Refuge Supervisor

Regional Refuge Supervisor

3-1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE SHIAWASSEE

MONTHS OF JANUARY TO APRIL, 1968

(1) Species	(2) Weeks of reporting period							(3) Estimated waterfowl days use	(4) Production Broods: Estimated seen : total	
	11	12	13	14	15	16	17	18	days use	seen : total
Swans:										
Whistling		700	1,500	2000	6	4	6		29,512	
Trumpeter										
Geese:										
Canada	3000	15000	11,500	11,500	6000	6000	700		421,176	
Cackling										
Brant										
White-fronted										
Snow					4	6	6		112	
Blue					8	10	10		196	
Other										
Ducks:										
Mallard	100	1100	2000	5000	5000	5000	600		136,724	
Black	100	700	700	1000	1000	1000	100		32,928	
Gadwall										
Baldpate		12	10	12	70	20	50		1,218	
Pintail	200	100	100	750	20	2	10		12,600	
Green-winged teal		50	50	20	10	10	50		1,260	
Blue-winged teal		15	10	10	10	100	300		3,745	
Cinnamon teal										
Shoveler		2	4	6	12	6	10		226	
Wood		3	10	50	100	100	100		2,511	
Redhead		15							133	
Ring-necked		50	30	20					700	
Canvasback				80					560	
Scaup		6	10	50	10				553	
Goldeneye										
Bufflehead				4	3				49	
Ruddy			3	3	3	4	4		119	
Other										
Coots:										
			3	20	40	60	200		2,261	
					(over)					

	(5)	(6)	(7)	
	Total Days Use :	Peak Number :	Total Production :	SUMMARY
Swans	29,512	2,000		Principal feeding areas <u>Farm Units 1, 2, 4, 5, 8</u>
Geese	421,484	15,000		
Ducks	193,494	7,007		Principal nesting areas _____
Coots	2,261	200		
				Reported by <u>Refuge Personnel</u>

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE SHIawassee

MONTHS OF JANUARY TO APRIL, 19 68

(1) Species	(2) Weeks of reporting period									
	1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	60	1	1	1	1	1	1	1	1	100
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	32									100
Black	4									100
Gadwall										
Baldpate										
Pintail										
Green-winged teal										
Blue-winged teal										
Cinnamon teal										
Shoveler										
Wood										4
Redhead										
Ring-necked										
Canvasback										3
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
Coot:										

3-1751

Form NR-1A
(Nov. 1945)MIGRATORY BIRDS
(other than waterfowl)Refuge SHIAWASSEE Months of JANUARY to APRIL 1946

(1) Species Common Name	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production		(6) Total Estimated Number
	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young
I. Water and Marsh Birds:									
Great Blue Heron	2	3/20	30	4/30					30
Green Heron	1	4/18	20	4/30					20
Pied-billed Grebe	1	3/31	10	4/30					10
American Egret	1	3/27	1	3/27	1	3/27			1
II. Shorebirds, Gulls and Terns:									
Killdeer	4	3/18	20	4/30					20
Yellowlegs	2	4/12	10	4/30					10
Spotted Sandpiper	1	4/30	1	4/30					1
Dowitcher	40	4/1	200	4/12					200
Common Tern	2	4/30	2	4/30					2
Ring-billed Gull	50	4/12	100	4/30					100
Herring Gull	3	4/30	3	4/30					3
III. Doves and Pigeons:									

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u>					
Mourning dove	Winter resident				50
White-winged dove					
IV. <u>Predaceous Birds:</u>					
Golden eagle					
Duck hawk					
Horned owl	Resident				10
Magpie					
Raven					
Crow	150	3/16	200	4/16	200
Bald Eagle	1	3/30	2	4/9	2
Red-tailed Hawk	1	3/16	5	4/30	5
Marsh Hawk	1	3/18	10	4/30	10
Sparrow Hawk	Winter resident		30	4/30	30
Turkey Vulture	2	3/31	20	4/30	20
Reported by.....					Refuge Personnel

INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
 II. Shorebirds, Gulls and Terns (Charadriiformes)
 III. Doves and Pigeons (Columbiformes)
 IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge CHATELAIN Months of JANUARY to APRIL, 19 68

(1) Species	(2) Density		(3) Young Produced	(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'd. Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	8000 ac., cropland bottomland hardwood marsh.	160		1:10				50	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1754

Form NR-4

(June 1945)

SMALL MAMMALS

Refuge SHIAWASSEEYear ending April 30, 1968

(1) Species	(2) Density	(3) Removals					(4) Disposition of Furs						(5) Total	
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re- stocking	For Re- search	Share Trapping			Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	Popula- tion
								Permit Number	Trappers Share	Refuge share				
Cottontail Rabbit	8000 acres. Cropland, bottomland hardwoods and marshes													Unknown
Fox Squirrel	" " "													Unknown
Opposum	" " "													30
Raccoon	" " "				6									50
Striped Skunk	" " "													10
Woodchuck	" " "				12									50
Red Squirrel	" " "													Unknown
Muskrat	1,000 acres, cattail marsh, rivers, and drainage ditches			363				T-9931						
				37				T-9932						
				150				T-9933	330	220	220			2500
Beaver	" " "													50
Mink	" " "													Unknown
Weasel	" " "													Unknown

* List removals by Predator Animal Hunter

* List removals by Predator Animal Hunter

REMARKS:

Reported by _____

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

- (1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)
- (2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed.
- (4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprime-ness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.
- (5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.
- REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

REFUGE GRAIN REPORT

Refuge SHIAWASSEE

Months of JANUARY through APRIL, 19568

(1) VARIETY*	(2) ON HAND BEGINNING OF PERIOD	(3) RECEIVED DURING PERIOD	(4) TOTAL	(5) GRAIN DISPOSED OF				(6) ON HAND END OF PERIOD	(7) PROPOSED OR SUITABLE USE*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Barley	50	-	50					50		50	
Ear Ear Corn	200	-	200			100	100	100		100	
Shelled Corn	2,127	-	2,127	465		400	865	1,262		1,262	

(8) Indicate shipping or collection points _____

(9) Grain is stored at Secondary headquarters granary.

(10) Remarks _____

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
- (4) A total of columns 2 and 3.
- (6) Column 4 less column 5.
- (7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters granary," etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

WATERFOWL

REFUGE SHILAWASSEE

MONTHS OF MAY TO AUGUST, 1968

(1) Species	Weeks of reporting period ⁽²⁾									
	1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling	2	2	2	1	1	1	1	1	1	1
Trumpeter										
Geese:										
Canada	700	700	900	900	900	900	900	900	900	900
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	100	100	150	150	500	1000	1500	2000	2000	2000
Black	30	30	100	100	200	200	300	300	400	400
Gadwall										
Baldpate	50	10	10					10	10	10
Pintail										
Green-winged teal	50									5
Blue-winged teal	200	300	300	300	300	300	300	300	300	300
Cinnamon teal										
Shoveler	20	10	10	10						
Wood	100	100	100	100	100	100	100	100	100	100
Redhead										
Ring-necked										
Canvasback										
Scaup	20									
Goldeneye										
Bufflehead										
Ruddy	1	2								
Other										
Coot:	200	200	200	200	200	200	200	200	200	200

3-1750a
 Cont. NR-1
 (Rev. March 1953)

WATERFOWL
 (Continuation Sheet)

REFUGE **SHIAWASSEE**

MONTHS OF **MAY** TO **AUGUST**, 19**68**

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production Broods: Estimated seen : total
	11	12	13	14	15	16	17	18		
Swans:										
Whistling	1	1							105	
Trumpeter										
Geese:										
Canada	900	900	900	900	900	900	900	900	110,600	300
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	1500	2000	2000	2500	4400	5000	5000	8600	283,500	15 100
Black	300	300	300	600	1000	1500	1500	2150	67,970	
Gadwall										
Baldpate		5	5	10					840	
Pintail										
Green-winged teal	5	5	10	20	30	30	80	40	1,645	
Blue-winged teal	300	300	300	300	400	400	400	400		2 15
Cinnamon teal										
Shoveler										
Wood	100	100	100	200	250	300	300	300	39,900	10 80
Redhead										
Ring-necked										
Canvasback										
Scaup									160	
Goldeneye										
Bufflehead										
Ruddy									42	
Other										
Coots:	200	200	200	200	200	200	200	200	25,200	150
					(over)					

	(5)	(6)	(7)	
Coops:	Total Days Use :	Peak Number :	Total Production :	SUMMARY
Swans	105	2		Principal feeding areas Within Pools 1A, 1B and 2 and
Geese	110,600	900	300	the adjacent croplands.
Ducks	394,037	11,490	195	Principal nesting areas Pool 2 main area for ducks &
Coots	25,200	200	150	coots. Pool 1A & 1B for geese.
				Reported by William H. Hutchinson

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge.....**SHIMASSER**

Months of **MAY** LAST to **AUGUST** 195**6**

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Pied-billed Grebe	1	3/31/68	10	August						10
Great Blue Heron	2	3/20/68	40	7/31/68						40
Green Heron			20	August						20
Common Egret	1	3/27/68	7	July						7
American Bittern			6	August						6
Black-crowned Night Heron			25	August						25
Sora Rail			10	August						10
Common Gallinule	1	5/25/68	15	July						15
Coot	5	3/11/68	250	August						25
King Rail	1	6/12/68	1	June					150	250
II. Shorebirds, Gulls and Terns:										
Killdeer	4	3/18/68	50	August						50
Semipalmated Sandpiper			200	August						200
Yellowlegs (Greater)	1	4/9/68	10	June						10
Dowitcher	40	4/1/68	40	April						40
Ring-billed Gull			25	July						25
Black Tern	4	5/22/68	10	July						10
Semipalmated Plover			15	July						15
Common Tern			25	July						25

(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove	Winter resident	100	August		100
IV. <u>Predaceous Birds:</u> Golden eagle Duck hawk Horned owl Magpie Raven Crow Bald Eagle Red-tailed Hawk Marsh Hawk Sparrow Hawk Cooper's Hawk Turkey Vulture	Resident				10
		50	August		50
	1	3/31/68	3	June	3
		5	July		5
	1	3/18/68	5	June	5
		15	July		15
		5	July		5
	1	3/31/68	30	June	30
Reported by _____ Refuge Personnel					

INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge SHIAWASSEE

For 12-month period ending August 31, 1968

Reported by William Hutchinson

Title Assistant Refuge Manager

(1) Area or Unit Designation	(2) Habitat		(3) Use-days	(4) Breeding Population	(5) Production
	Type	Acres			
Unit 1	Crops	3,082	Ducks	4,177,950	500
	Upland	366	Geese	1,100,561	600
	Marsh	1,179	Swans	29,722	
	Water	192	Coots	33,691	200
	Total	4,819	Total	5,341,924	1,300
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

- (1) **Area or Unit:** A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.
- (2) **Habitat:** Crope include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; march extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.
- (3) **Use-days:** Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.
- (4) **Breeding Population:** An estimate of the total breeding population of each category of birds for each area or unit.
- (5) **Production:** Estimated total number of young raised to flight age.

WATERFOWL

REFUGE SHIANASSIE

MONTHS OF SEPTEMBER TO DECEMBER, 19 68

(1) Species	Weeks of reporting period ⁽²⁾									
	1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling									3	
Trumpeter										
Geese:										
Canada	900	3,600	5,300	4,260	7,500	8,000	10,100	15,200	16,400	16,600
Cackling										
Brant										
White-fronted										
Snow					26	6	6	6	8	12
Blue					24	6	6	6	118	438
Other										
Ducks:										
Mallard	8,600	16,300	19,800	22,600	22,900	22,900	39,150	45,000	39,750	50,000
Black	2,150	8,200	8,800	11,300	11,400	11,400	13,250	13,250	15,000	15,000
Gadwall										
Baldpate		60	100	100	100	100	50	50	50	
Pintail		80	200	200	200	200	200	200	600	300
Green-winged teal	40	100	200	2,000	200	200	300	300	200	
Blue-winged teal	400	450	500	500	100	100	100			
Cinnamon teal										
Shoveler										
Wood	300	350	500	500	200	200	100	50		
Redhead										
Ring-necked										
Canvasback										
Scaup									5	
Goldeneye										
Bufflehead										
Ruddy				4						
Other										
Coot:	200	200	200	200	100	100	100	100	100	100

3-1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE SHIAWASSEE

MONTHS OF SEPTEMBER TO DECEMBER, 19 68

(1) Species	(2) Weeks of reporting period								(3) Estimated waterfowl days use	(4) Production Broods: Estimated seen : total
	11	12	13	14	15	16	17	18		
Swans:										
Whistling	51	1	7						434	
Trumpeter										
Geese:										
Canada	19,600	15,300	16,500	16,500	2,500	2,000	2,000	2,000	1,143,820	
Cackling										
Brant										
White-fronted										
Snow									448	
Blue	12	12							4,354	
Other										
Ducks:										
Mallard	55,000	50,000	24,000	14,000	4,200	1,200	1,200	900	3,059,800	
Black	15,000	8,000	6,000	2,500	800	300	300	200	999,950	
Gadwall										
Baldpate									4,270	
Pintail	200								12,460	
Green-winged teal									24,780	
Blue-winged teal									15,050	
Cinnamon teal										
Shoveler										
Wood									15,400	
Redhead										
Ring-necked										
Canvasback										
Scaup									35	
Goldeneye										
Bufflehead	10								70	
Ruddy										
Other										
Coots:										
	100	50	20						10,990	
					(over)					

	(5)	(6)	(7)	SUMMARY
	Total Days Use :	Peak Number :	Total Production :	
Swans	434	51		Principal feeding areas Pools 1 and 2; Crop Units 1,3, 4,5 &
Geese	1,148,622	19,600		Private lands north and west of refuge
Ducks	4,131,843	70,200		Principal nesting areas
Coots	10,990	200		
				Reported by Refuge Personnel

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

- (1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.
- (2) Weeks of Reporting Period: Estimated average refuge populations.
- (3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.
- (4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.
- (5) Total Days Use: A summary of data recorded under (3).
- (6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.
- (7) Total Production: A summary of data recorded under (4).

3-1751

Form NR-1A

(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)Refuge SHIAWASSEEMonths of SEPTEMBER to DECEMBER 1968

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. <u>Water and Marsh Birds:</u>										
Pied-billed Grebe			20	September	1	11/10				20
Great Blue Heron			40	September	18	12/6				40
Green Heron			30	September	2	October				30
Common Egret			1	October	1	10/24				1
American Bittern			20	September		September				20
Black-crowned Night Heron			25	September	3	10/24				25
Sora Rail			10	September		September				10
Common Gallinule			15	September	1	10/24				15
Sandhill Crane	18	11/10	18	11/10	18	11/10				18
II. <u>Shorebirds, Gulls and Terns:</u>										
Killdeer			50	September		November				50
Yellowlegs			10	September	1	10/28				10
Ring-billed Gull			300	November	Still present					300
Herring Gull			50	November	Still present					50
III. <u>DOANE SUB SPECIES:</u>										

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. <u>Doves and Pigeons:</u> Mourning dove White-winged dove		300	September Still present		300
IV. <u>Predaceous Birds:</u> Golden eagle Duck hawk Horned owl Magpie Raven Crow Bald Eagle Marsh Hawk Red-tailed Hawk Am. Rough-legged Hawk Sparrow Hawk Turkey Vulture Snowy Owl	Resident 1	 300 2 20 10 1 30 40 1	 September 10 September 1 September September 1 10/24 3 September 5 September 12/31	 October 12/20 10/28 October 12/24 12/31 12/31 October	 300 2 20 10 3 30 40 1
Reported by..... Refuge Personnel					

INSTRUCTIONS

- (1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)
- (2) First Seen: The first refuge record for the species for the season concerned.
- (3) Peak Numbers: The greatest number of the species present in a limited interval of time.
- (4) Last Seen: The last refuge record for the species during the season concerned.
- (5) Production: Estimated number of young produced based on observations and actual counts.
- (6) Total: Estimated total number of the species using the refuge during the period concerned.

3-1750c
Form NR-1C
(Sept. 1960)

WATERFOWL HUNTER KILL SURVEY

Refuge SHIAWASSEE

Year 1968

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
10/22-26	215	1,052	Canada Goose (8)	8		8	215	8
10/27-11/2	280	1,706	Canada Goose (3)	3	3	6	280	6
11/3-9	295	1,458	Canada Goose (10)	10		10	295	10
11/10-16	157	798	Canada Goose (8)	8	1	9	157	9
TOTALS:	947	5,014	Canada Goose (29)	29	4	33	947	33

(over)

INSTRUCTIONS

- (1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.
- (2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.
- (3) Record the total number of hours the hunters spent hunting on the refuge.
- (4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).
- (5) Record total numbers of waterfowl bagged.
- (6) Record total numbers of waterfowl reported knocked down but not recovered.
- (7) Total of Columns 5 and 6.
- (8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).
- (9) Kill sample projected to 100 percent. $\text{Column 9} = \frac{\text{Column 8}}{\text{Column 2}} \times \text{Column 7}.$

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge SHIAWASSEE

Months of SEPTEMBER to DECEMBER, 19 68

(1) Species	(2) Density	(3) Young Produced			(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres Per Bird	Number broods observed	Estimated Total	Percentage	Hunting	For Re- stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	Croplands, bottom- land hardwoods and marshes - 8,000 ac.	160			1:10				50	

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS*

- (1) SPECIES: Use correct common name.
- (2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
- (4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
- (5) REMOVALS: Indicate total number in each category removed during the report period.
- (6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
- (7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

*Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge SHIAWASSEE

Calendar Year 1968

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions	(7) Estimated Total Refuge Population		(8) Sex Ratio
			Hunting	For Re- stocking	Sold	For Research	Predation	Disease	Winter Loss		At period of Greatest use	As of Dec. 31	
Common Name	Cover types, total Acreage of Habitat	Number								Number	Source		
White-tailed Deer	Bottomland hardwoods, crop- lands, marshes (8000 acres)	400	300						10		1,000	700	1:4

Remarks: The hunting removals include estimated 100 taken during bucks-only shotgun season, estimated 150 taken during December archery season, and an estimated illegal kills and un-retraved kills total of 50.

Reported by _____

INSTRUCTIONS

Form NR-3 - BIG GAME

- (1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.
- (2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
- (3) YOUNG PRODUCED: Estimated total number of young produced on refuge.
- (4) REMOVALS: Indicate total number in each category removed during the year.
- (5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.
- (6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.
- (7) TOTAL REFUGE POPULATION: Give the estimated population of each species on the refuge at period of its greatest abundance and also as of Dec. 31.
- (8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

DISEASE

Refuge SHIAWASSEE

Year 19.68

Botulism

Period of outbreak NONE

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.) _____

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease

Kind of disease NONE

Species affected _____

Number Affected Species	Actual Count	Estimated
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

3-1757
Form NR-7
(Rev. June 1960)

(1)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

Refuge SHILAHASSEE Year 19 68

Collections and Receipts (Seeds, rootstocks, trees, shrubs)							Plantings (Marsh - Aquatic - Upland)						
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
NONE							NONE						

- (1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:

Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks: _____

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge SHIAWASSEE

County SAGINAW

State MICHIGAN

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested		Unharvested				
			Acres	Bu./Tons	Acres	Bu./Tons			
Wheat	158	7,309	30	1,608	67	2,530	225	Clover w/grains	799
Barley	110	5,645			464	26,991	574	Ryegrass w/corn	601
Field Corn	395	31,338			176	15,786	601	Oats browse	201
White Beans	932	14,201					932	Winter wheat	129
Soybeans	331	10,292			67	2,106	398		
Buckwheat					40	2,000	40		
Oats	9	450			7	350	16		
Millet					75	3,750	75		
Sugar Beets	129	2,987 (tons)			8	196	137	Fallow Ag. Land	0

No. of Permittees: Agricultural Operations 19 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle				
				2. Other				
				1. Total Refuge Acreage Under Cultivation				2,998
Hay - Wild				2. Acreage Cultivated as Service Operation				0

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

REFUGE GRAIN REPORT

Refuge SHIAWASSEEMonths of MAY through DECEMBER, 1968

(1) VARIETY*	(2) ON HAND BEGINNING OF PERIOD	(3) RECEIVED DURING PERIOD	(4) TOTAL	(5) GRAIN DISPOSED OF				(6) ON HAND END OF PERIOD	(7) PROPOSED OR SUITABLE USE*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Barley	50		50			50	50	0			
Ear Corn	100		100			100	100	0			
Shelled Corn	1262	1608	2870	635		885	1520	1350		1350	

(8) Indicate shipping or collection points _____

(9) Grain is stored at commercial elevator, Birch Run, Michigan(10) Remarks corn remaining following scheduled transfers to Seney & Ottawa Refuges will be stored in refuge granary.

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

- (1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR-9.
- (3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
- (4) A total of columns 2 and 3.
- (6) Column 4 less column 5.
- (7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
- (8) Nearest railroad station for shipping and receiving.
- (9) Where stored on refuge: "Headquarters granary," etc.
- (10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

TIMBER REMOVAL

Year ~~195~~ 68

No. of units removed B. F. _____ Method of slash disposal _____
Cords _____
Ties _____

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

Refuge

SEI AWASSER

ANNUAL REPORT OF PERSTICIDE APPLICATION

Proposal Number

Reporting Year

1968

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
May 21 thru July 10	Willow, cotton- wood, Canada thistle, velvet- leaf, nettles, poison ivy	Eastwood Drain, all dikes, farm unit ditchbanks, road ditches, nature trail	23	2,4,5-T/2,4-D Mixture	48 lbs.	2#/ac. (a.i.)	Water 2.5 pt. chemical per 100 gals.	T tractor powered broad- jet sprayer

10. Summary of results (continue on reverse side, if necessary)

80% kill on most woody species with slight re-growth. 90% top kill on broad-leaved weeds with 40% re-growth.
100% kill on nettles and poison ivy along nature trail with no re-growth.



Jack Frye
Refuge Manager



David Hoff
Asst. Refuge Mgr.



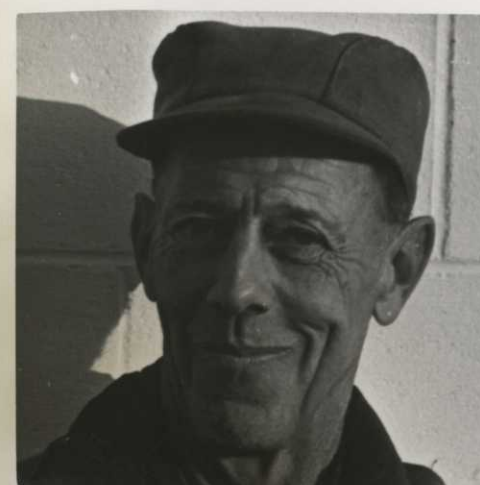
Sam Poma
Refuge Clerk



Louis Robinson
Biological Technician



Larry Blazo
Operator General



Kenneth Shelley
Operator General



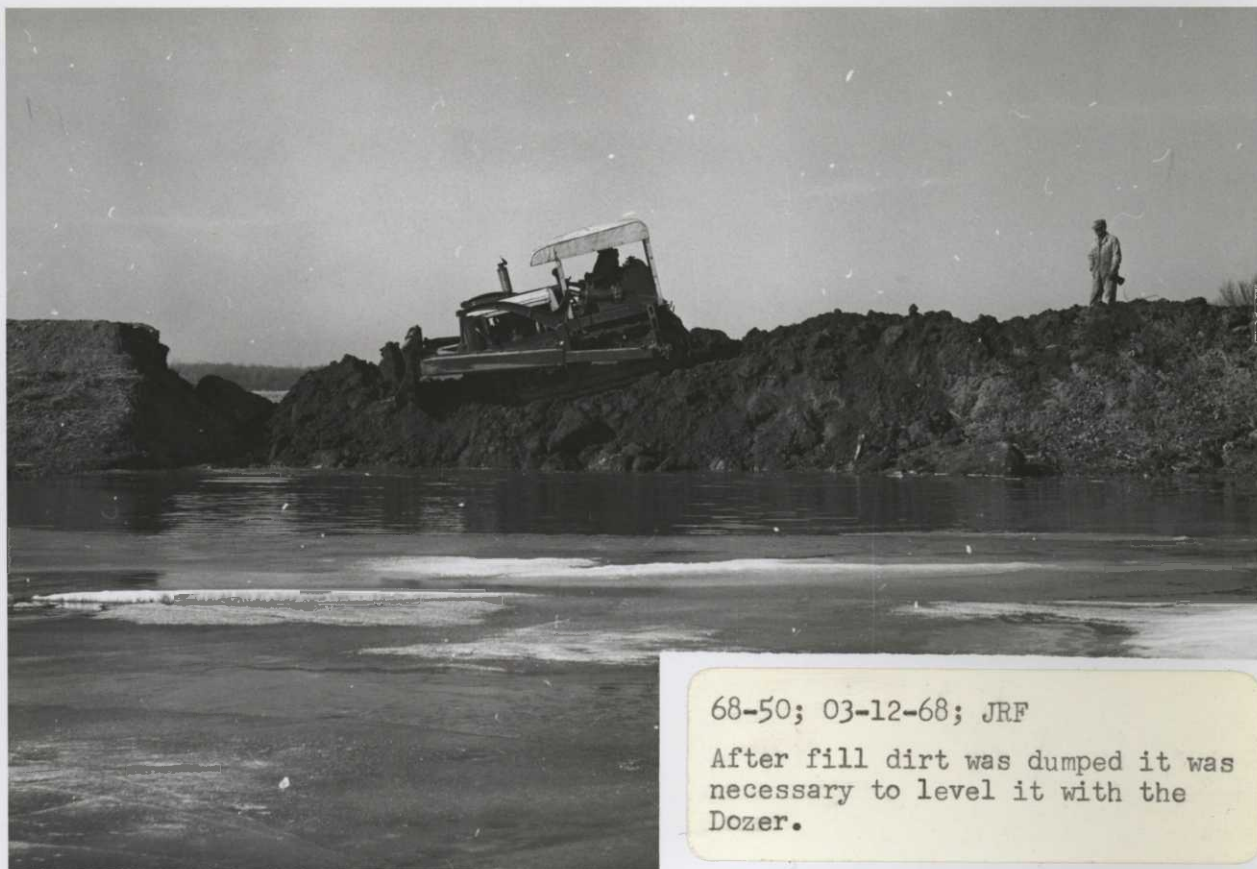
68-42; 03-03-68; JRF

Two major washouts in the Pool 2 south dike occurred with the February flood.



68-44; 03-11-68; JRF

Flood damage could only be repaired by hauling fill.



68-50; 03-12-68; JRF

After fill dirt was dumped it was necessary to level it with the Dozer.



68-75; 03-18-68; JRF

Completed repairs to the south dike of Pool 2.



68-258; 06-23-68; JRF

Major break in east dike of Pool
1A after second 1968 flooding.



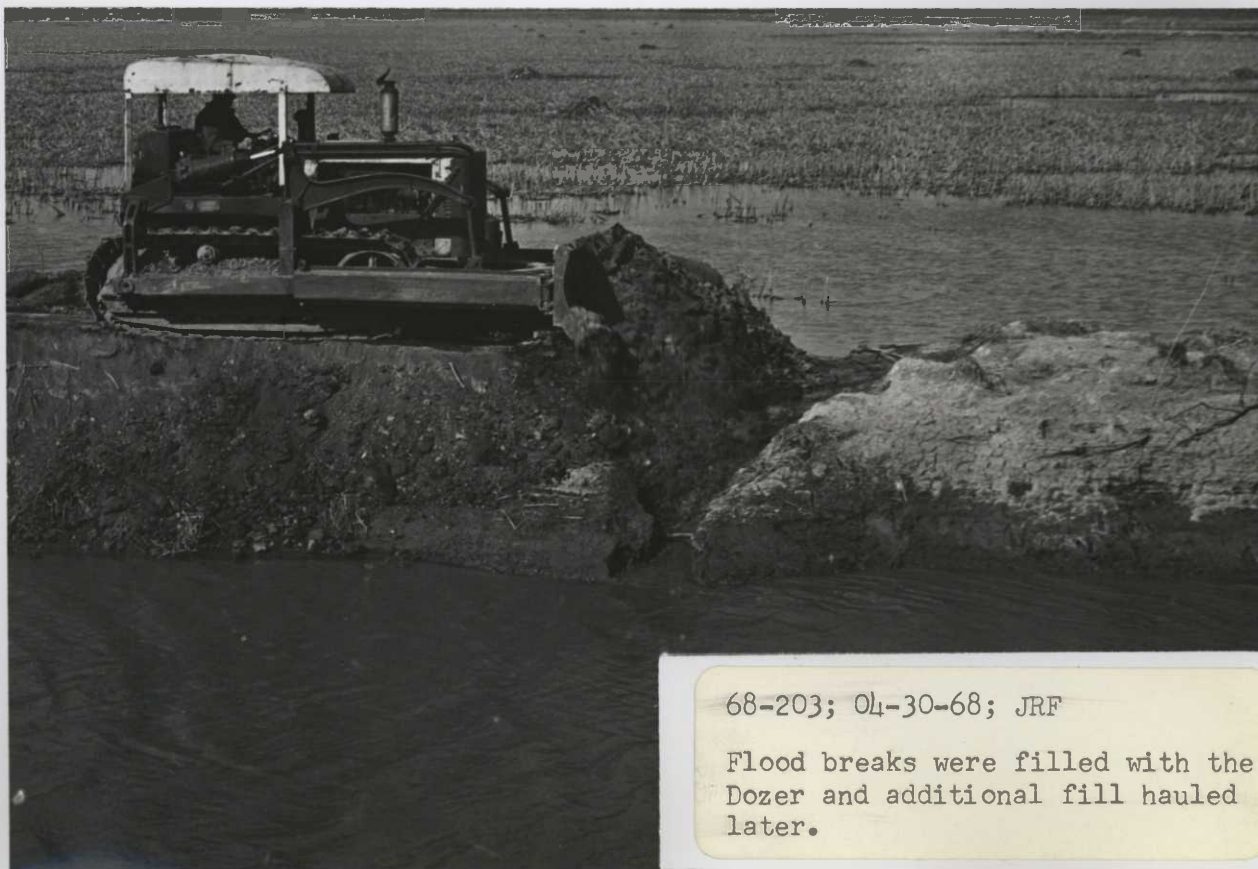
68-130; 04-10-68; JRF

Flood break in the east dike of
Spaulding Drain that flooded
Farm Unit 9.



68-112; 04-03-68; JRF

Flood damage to east dike of
Pool 2. One of six breaks.



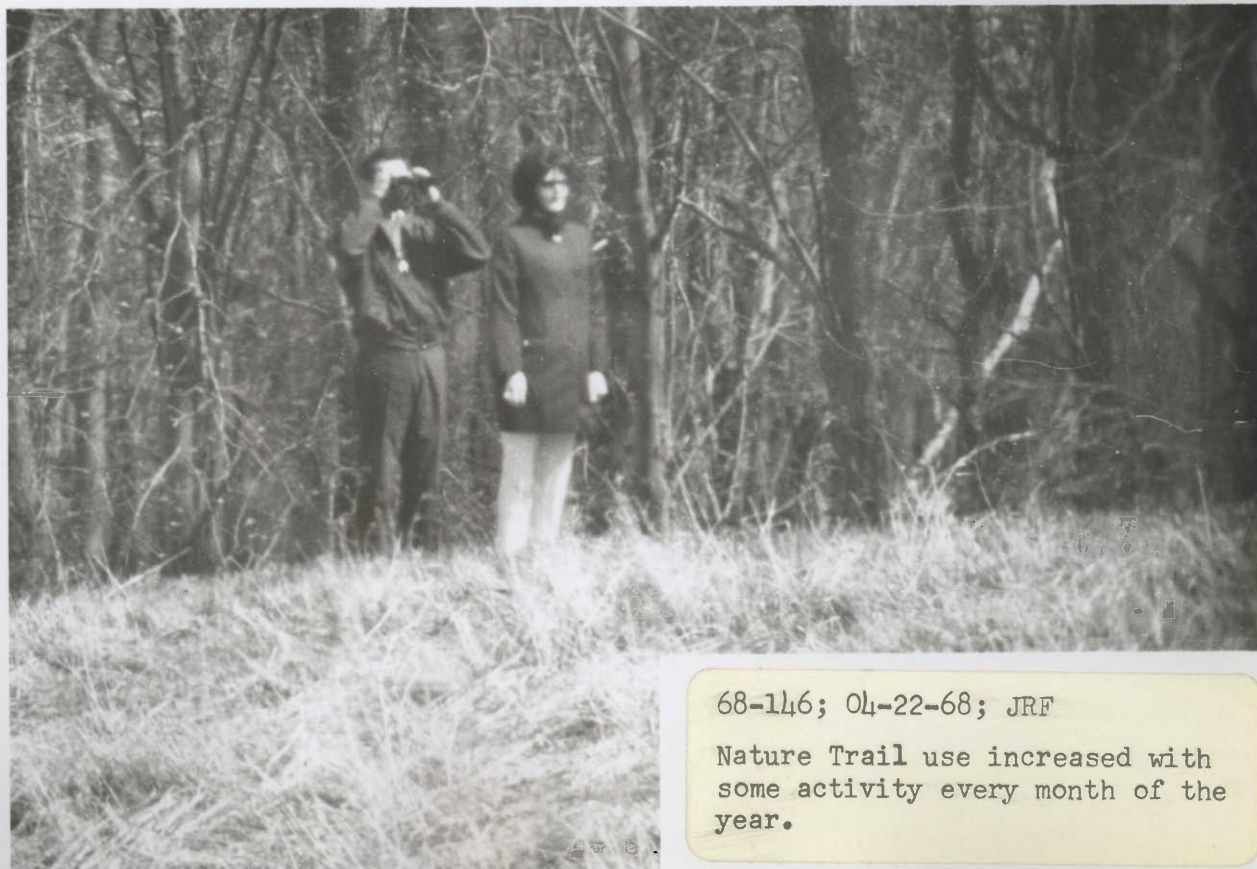
68-203; 04-30-68; JRF

Flood breaks were filled with the
Dozer and additional fill hauled
later.



68-201; 04-26-68; SSP

Demands for tours for school groups continue to increase each year.



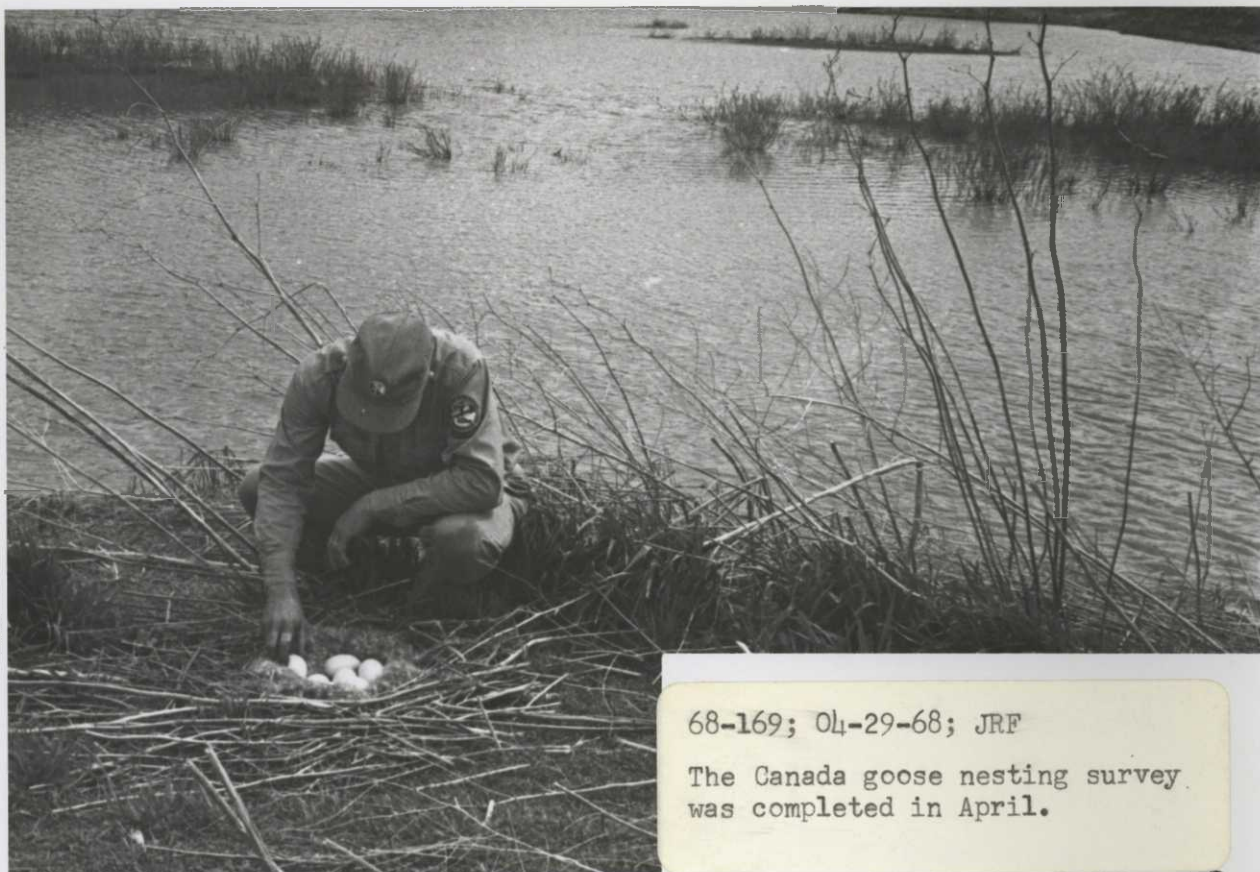
68-116; 04-22-68; JRF

Nature Trail use increased with some activity every month of the year.



68-59 & 61; 03-19-68; JRF

Swans and geese utilized flooded
corn fields in the spring.



68-169; 04-29-68; JRF

The Canada goose nesting survey
was completed in April.



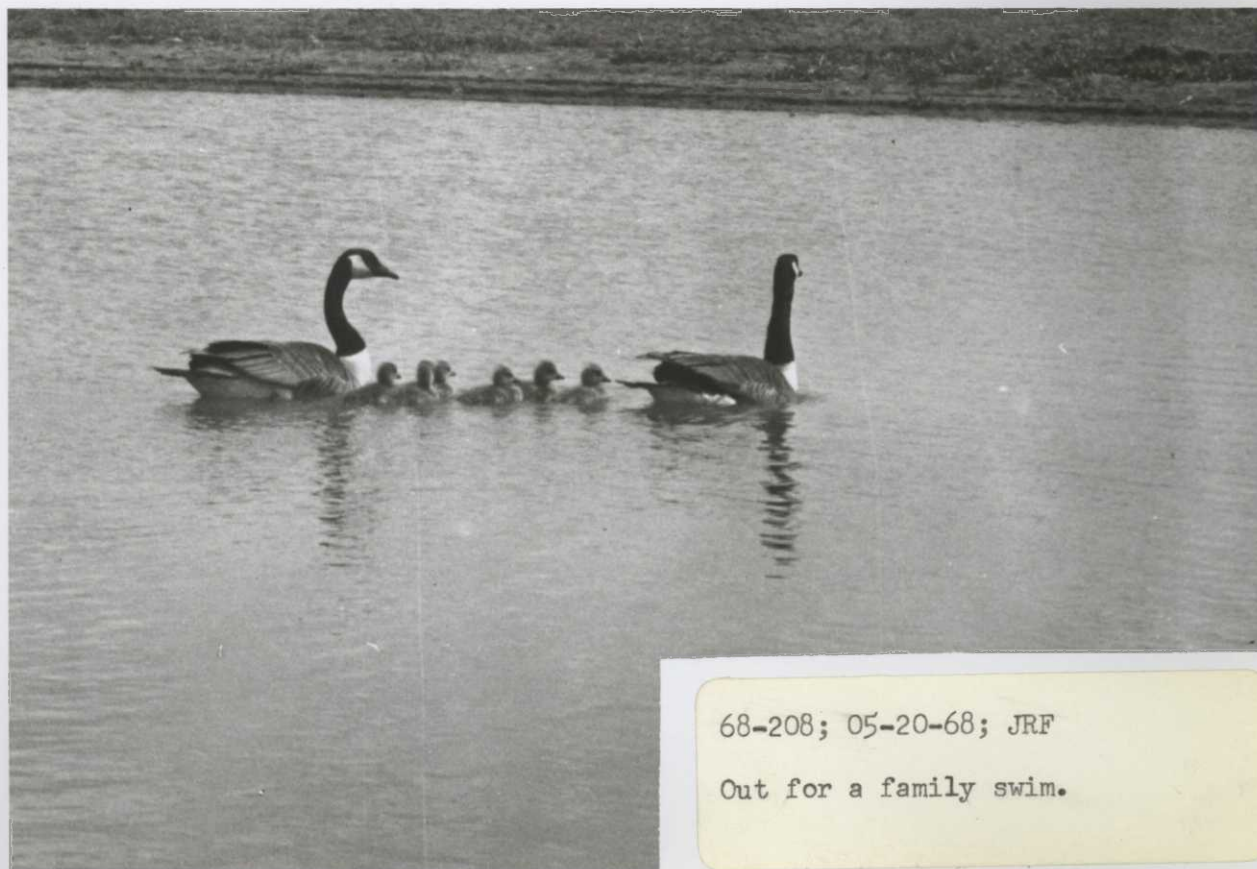
68-184; 05-09-68; JRF

Goose broods began hatching
in early May. Photo



68-252; 06-23-68; JRF

Spring is the time for the new generation to arrive.



68-208; 05-20-68; JRF

Out for a family swim.



68-244; 06-18-68; JRF

Brer Fox on a hunting excursion.



68-196; 05-14-68; JRF

As farm crops germinate, goslings
feed on new green shoots.



68-240 & 242; 06-13-68; JRF

Annual drive trapping of goslings
after feeding starts on new green
plants in croplands.



68-134 & 135; 04-15-68; JRF
 Goose trapped in cannon-net had
 steel trap on leg; foot attached
 only by one tendon.



68-427; 11-16-68; JRF
68-393; 11-08-68; JRF

Harvested corn fields attract
deer as well as waterfowl.



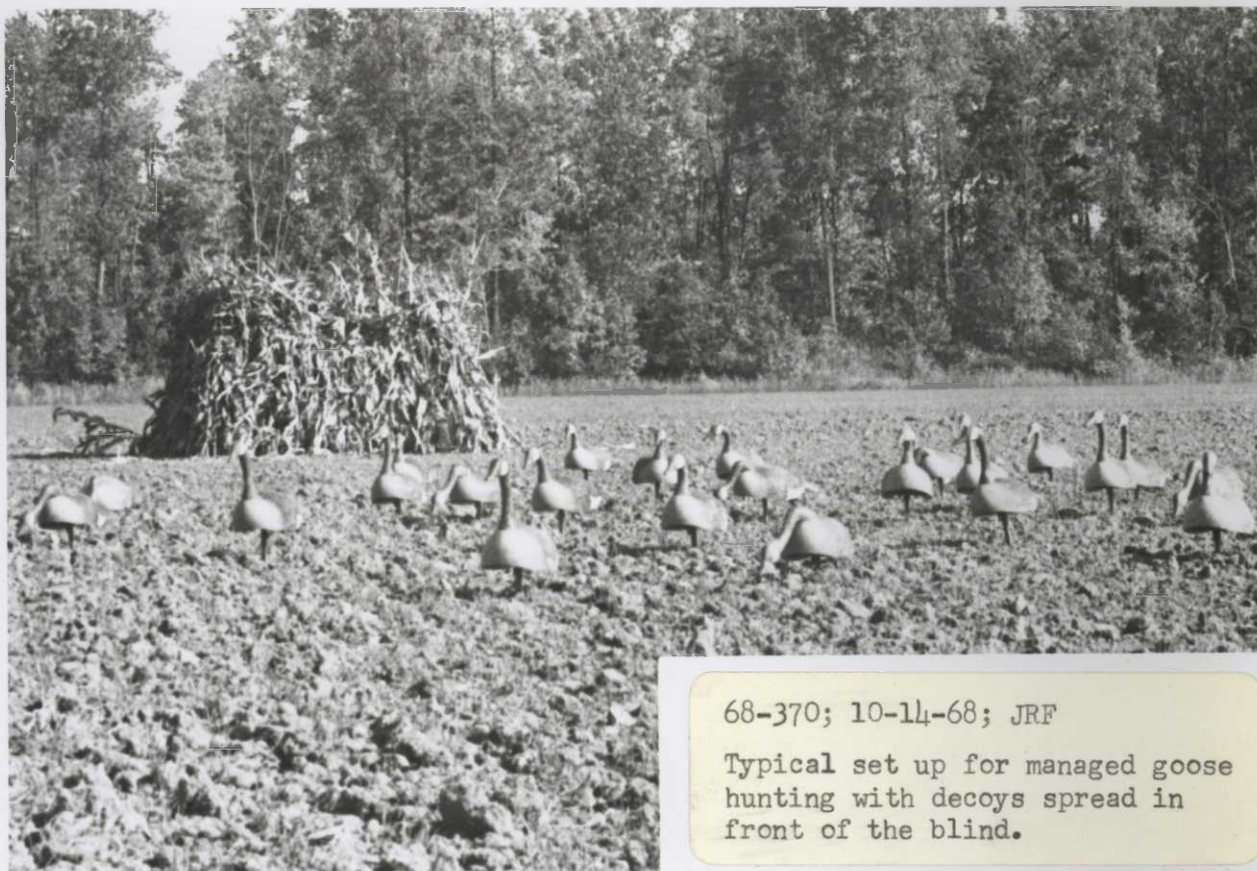
68-381; 10-21-68; JRF (before)
68-408; 11-14-68; JRF (after)

Sugar beets spilled on top of the
ground were completely eaten by
geese.



68-380 & 388; 11-02-68; JRF

Whole sugar beets fed on by
Canada geese.



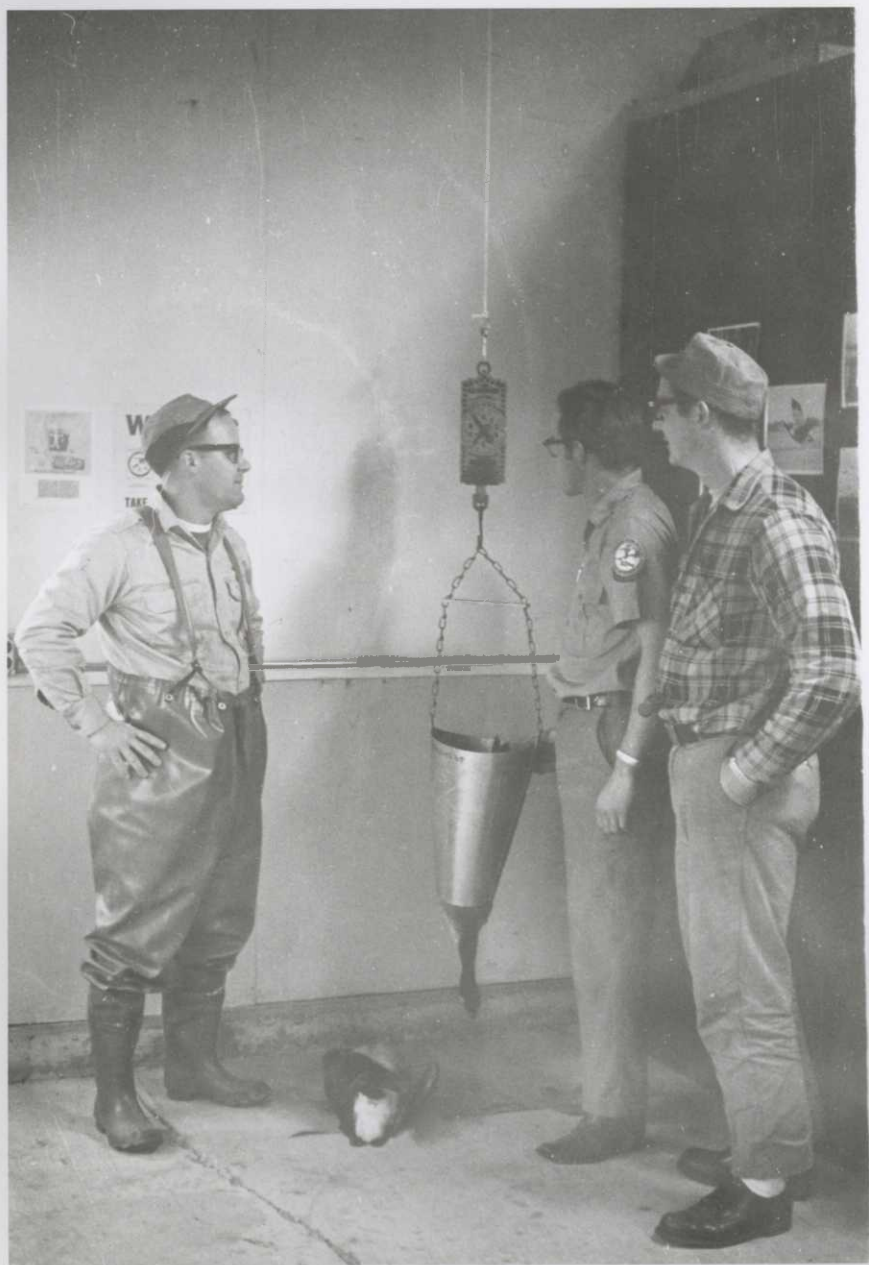
68-370; 10-14-68; JRF

Typical set up for managed goose hunting with decoys spread in front of the blind.



68-360; 10-10-68; JRF

Geese fed in the area of blinds in Hunting Area 3 prior to the opening of the goose season.



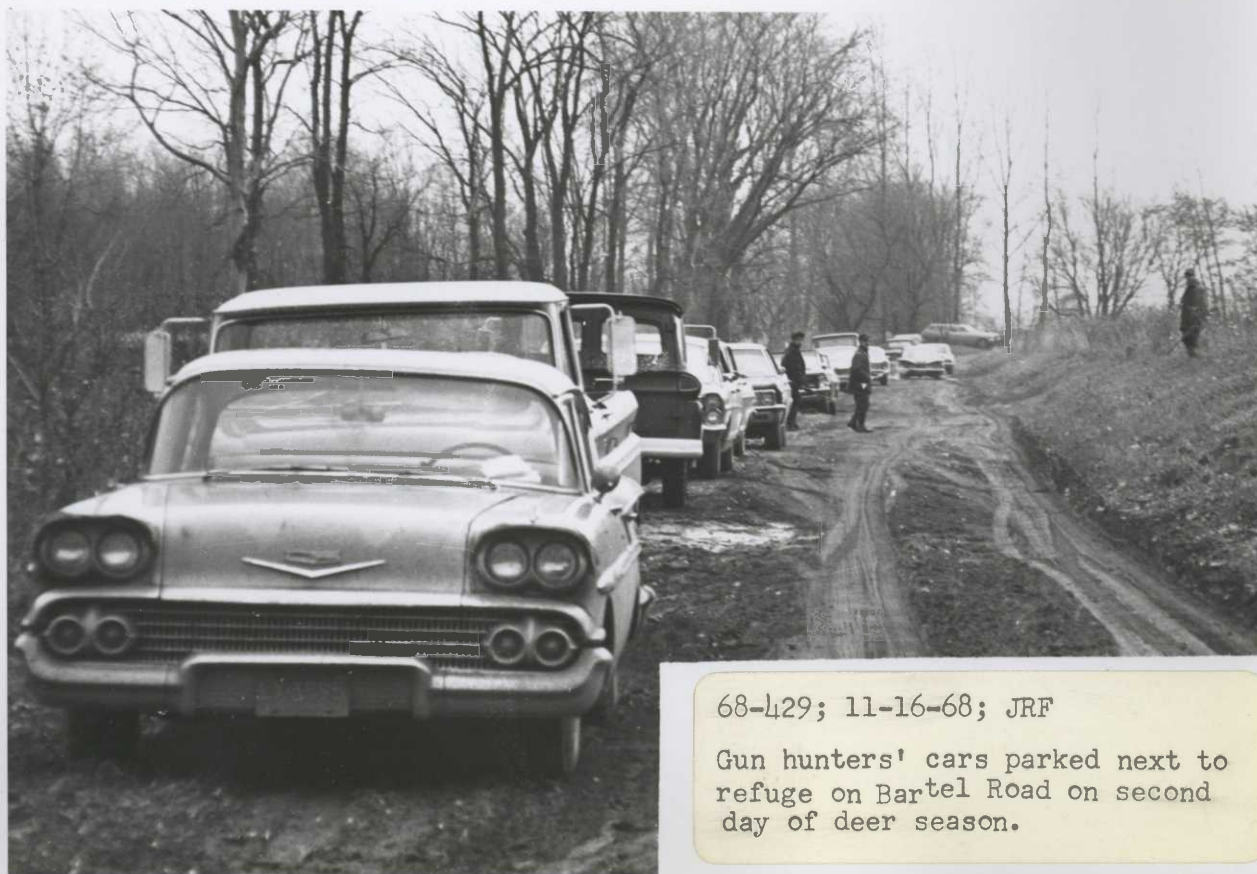
68-383 & 387; 10-25-68; JRF

Geese taken from hunting areas
were weighed, sexed and aged at
the check station.



68-449; 12-01-68; JRF

Bow-hunters' cars parked at the Curtis Road entrance to the refuge hunting area.



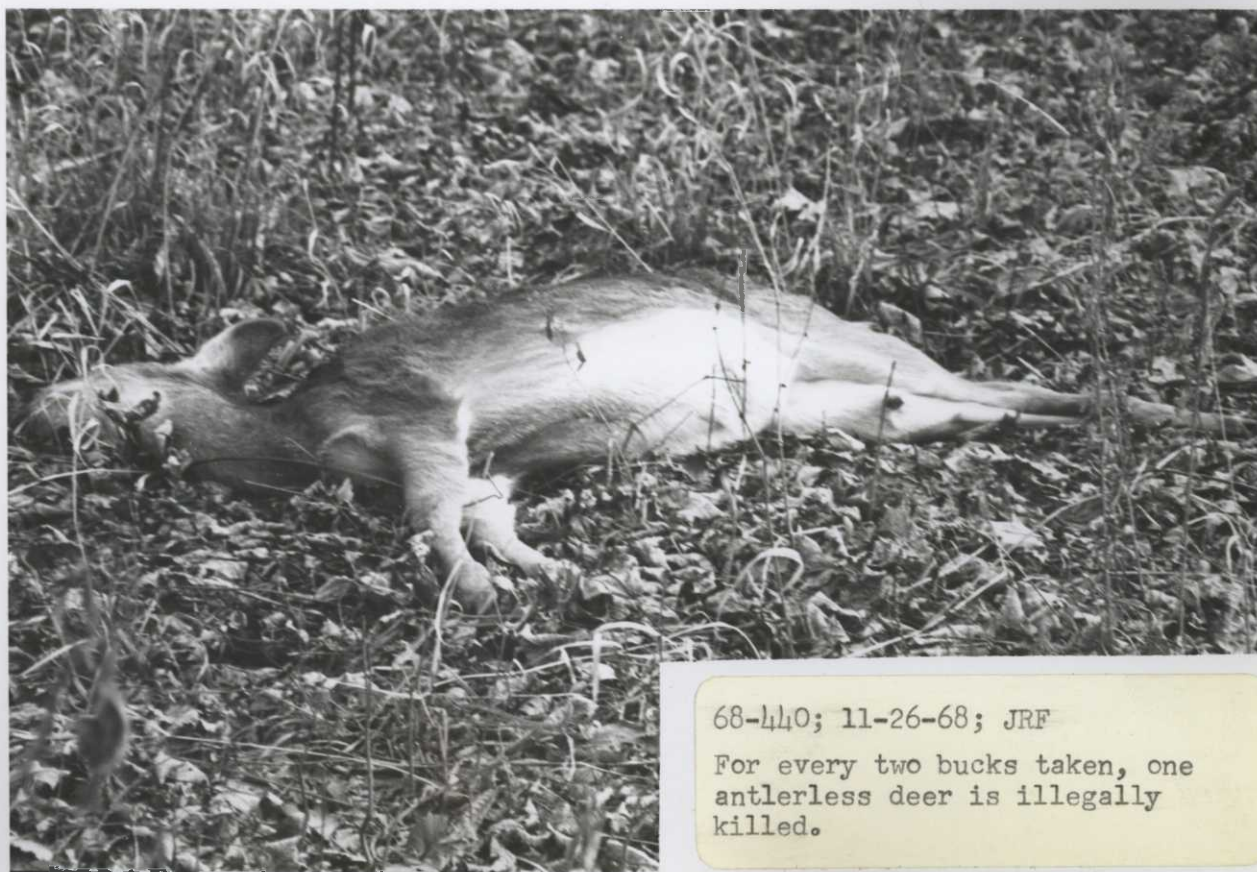
68-429; 11-16-68; JRF

Gun hunters' cars parked next to refuge on Bartel Road on second day of deer season.



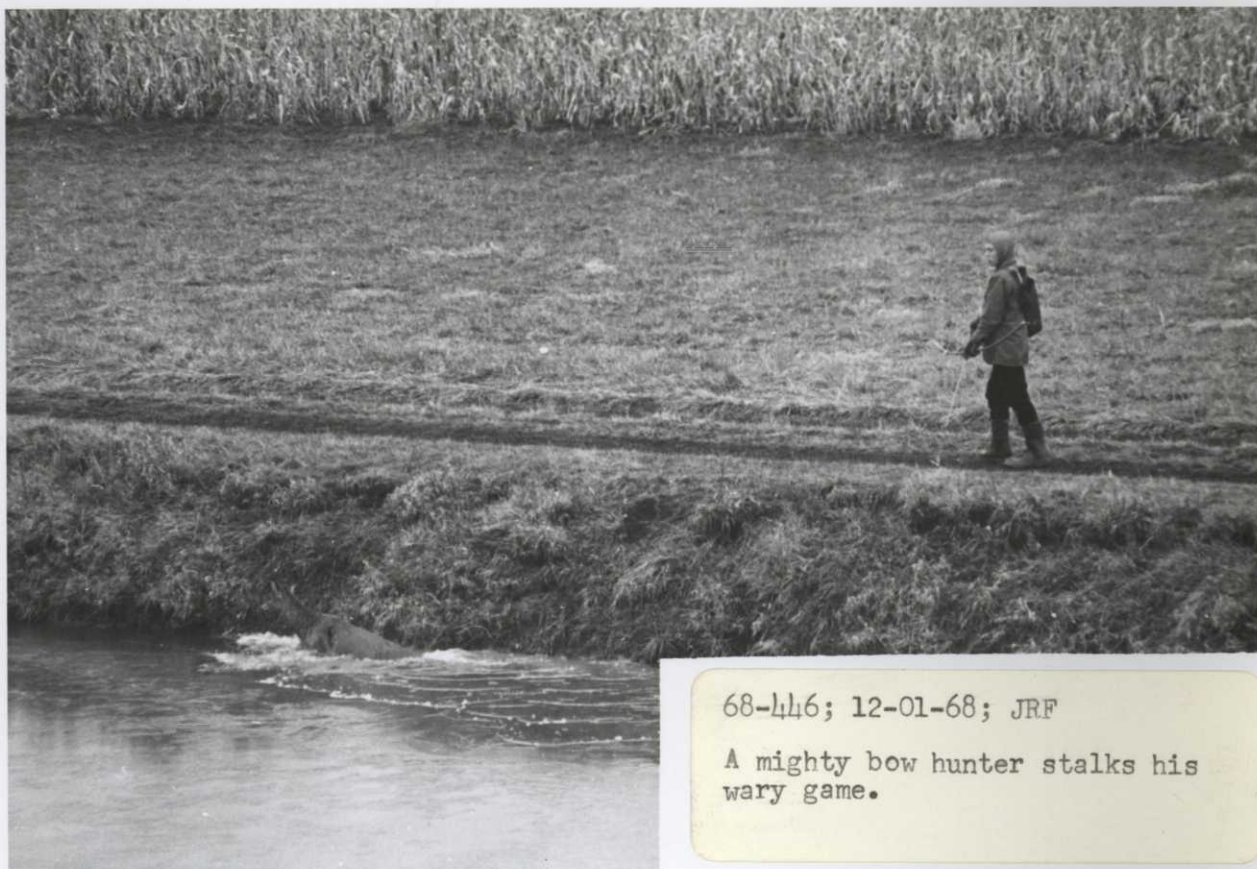
68-416; 11-15-68; JRF

A happy hunter begins to dress out his buck.



68-440; 11-26-68; JRF

For every two bucks taken, one antlerless deer is illegally killed.



68-446; 12-01-68; JRF

A mighty bow hunter stalks his wary game.



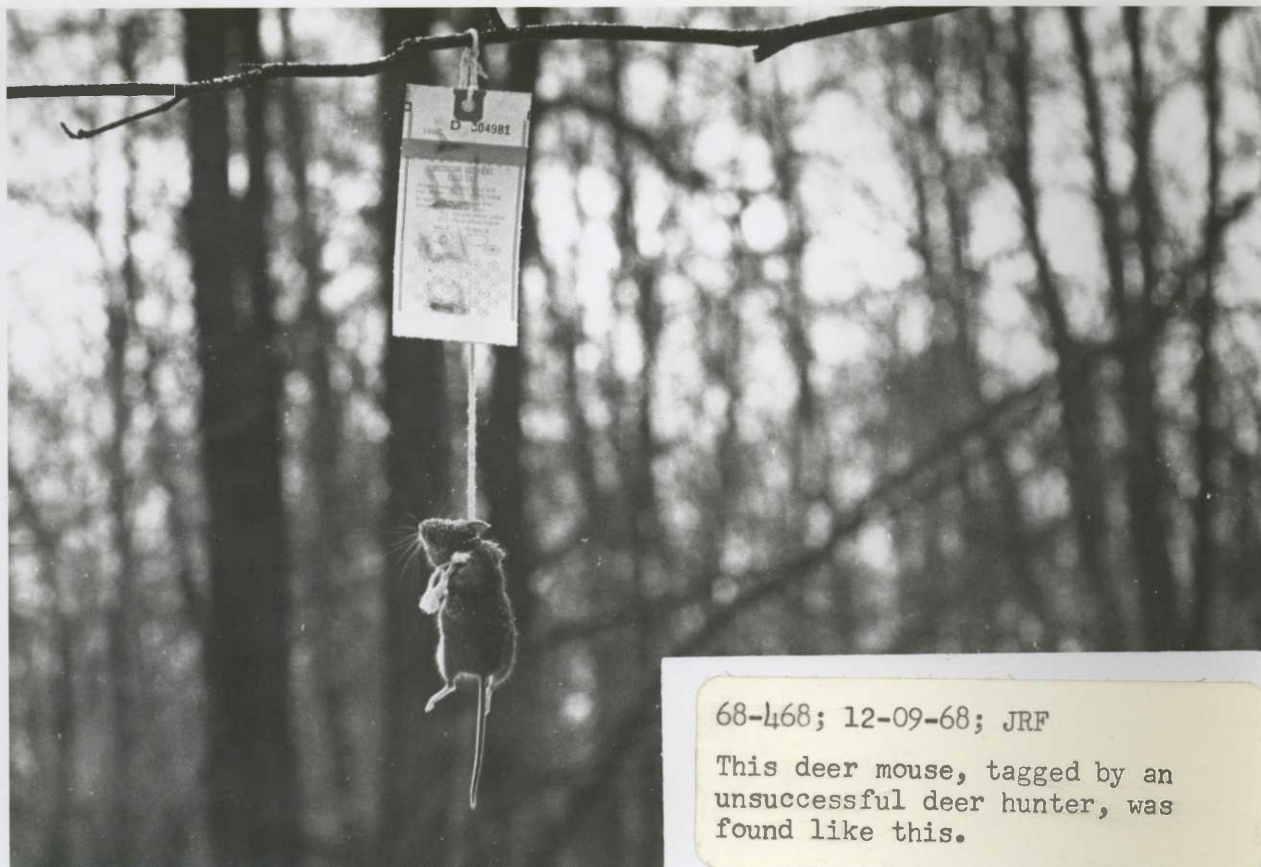
68-447; 12-01-68; JRF

Other archers immediately offer assistance in killing this very dangerous big game animal.



68-462 & 464; 12-07-68; JRF

Successful bow hunters who speared
deer on ice of Pool 1B.



68-468; 12-09-68; JRF

This deer mouse, tagged by an unsuccessful deer hunter, was found like this.



68-467; 10-09-68; JRF

The sign-shooters are still with us and are seldom caught.